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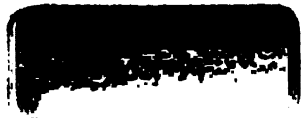

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THE

SANITARIAN,

A MONTHLY MAGAZINE

DEVOTED TO THE

PRESERVATION OF HEALTH, MENTAL AND PHY-

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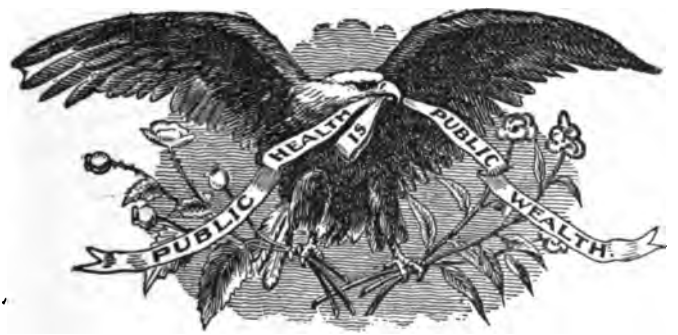

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NUMBER 350.

DWELLING ACCOMMODATION IN LARGE CITIES.*

THE HOUSING OF THE WORKING CLASSES.

BY T. DE COURCY MEADE, M. I. C. E.

The difficulties of providing sufficient suitable accommodation at reasonable cost for persons of the working class displaced from unsanitary areas, or from areas cleared for street improvements and railway works, are in most instances very great, and are generally enhanced by the tendency to overcrowd, which in many cases unduly increases the number of persons to be provided for upon areas already too limited. These difficulties have been met in Manchester by the erection on the cleared site of (*a*) blocks of five-storied tenements, approached by a common stairs and balconies; (*b*) blocks of tenements of two and three stories, with separate entrance and stairs to each set of tenements; (*c*) terrace cottages of five rooms each; (*d*) a model lodging-house. By the kindness of the chairman of the Sanitary Committee of the Manchester Corporation, Alderman Walton Smith, J. P., drawings of all these buildings were lent for the inspection of visitors to the congress. The Manchester Corporation are also erecting (*e*) cottage dwellings in the outskirts of the city, about two and a half miles from the cleared areas, where land is less costly. These cottages vary somewhat in character, and contain from five to seven rooms each. The buildings class (*a*) have been occupied about three years, and are let at rents which yield a moderate return upon the cost of erection. The two blocks (*a*) of five-storied buildings cost about £87,000 exclusive of

*Abstract of papers read at the Seventeenth Annual Congress of the Sanitary Institute, Birmingham, September 27-30, 1898.—From The Surveyor.

the cost of sites. The latter, with old buildings thereon, cost about £54,000. Single-room tenements are let at 2s. 6d. per week; the rent of two or three roomed tenements varies from 3s. to 5s. per week.

In addition to the above-mentioned new buildings, much has been done in the improvement of existing dwellings and the conversion of "back-to-back" houses into "through" houses. This work, though excellent where it is effected, has a tendency to cause overcrowding elsewhere, as the number of persons that can be accommodated in the converted and improved dwellings is much less than was crowded into the "back-to-back" houses before alteration. Full details of the procedure of the Manchester Corporation regarding the treatment of unsanitary "back-to-back" houses will be found in Dr. Niven's interesting paper on the subject (see "The Journal of the Sanitary Institute," vol. xvi., page 254). That paper is accompanied by plans showing the methods generally adopted in the alteration of "back-to-back" houses. From these it will be seen that in all cases the groups of pail-closets used by the occupiers of one or more blocks of houses are removed, and that each "through" house is provided with a proper water-closet. The substitution of private water-closets for common pail-closets and privies is thus gradually proceeding, but will doubtless be a work of time.

There are at present in the city of Manchester 76,913 pail-closets, 22,990 privies and 13,014 middens, but these numbers are annually becoming less, as water-closets are being provided wherever alterations to property are effected by the corporation. About 900 tons of fæcal matter is collected from the pail-closets per week, and about half this quantity is dried and converted into concentrated manure and sold; the remainder is mixed with ashes and rubbish and disposed of among farmers on the corporation estates at Carrington and Chat Moss. These estates have an area of about 3,750 acres, and it is estimated that about 93,000 tons of mixed night-soil can be thus annually disposed of.

THE TREATMENT OF SEWAGE

is a subject of general interest to most of those present, therefore a few particulars of the cost, etc., of treatment at the Manchester outfall works may not be out of place. The population contributing to the sewage system increased from 400,360 on the

1st of January, 1897, to 512,500 on the 31st of December, 1897. The average daily flow during 1897 was 20,426,363 gallons. The flow per head of the population ranged from 39.3 gallons per day in May to 50 gallons per head in December last. The quantity of water supplied by the corporation is about 28 gallons per head per day. It is estimated that about 17 gallons are supplied for domestic use, and the remaining 11 gallons for trading and public purposes. The difference between the total quantity of water supplied and the average quantity of sewage reaching the works is largely due to the admission of underground water, which passes into the old sewers and drains through defective joints. The net cost of treatment for 1897 was £19,089 9s. 7d., exclusive of interest and repayment of capital, or £2 11s. 9d. per 1,000,000 gallons treated, apportioned as follows:

	1896. Per 1,0000,00 gallons.			1897. Per 1,000,000 gallons.		
	£	s.	d.	£	s.	d.
Precipitation (labor and chemicals only).	1	2	11	1	0	7.1
Sludge disposal (labor and materials only).	0	14	3.6	0	13	9.7
Filtration (a small proportion only of the sewage was filtered)	0	1	1	0	0	5.9
Coal (this includes all steam-power used on the works, but does not include coal for the steamer)	0	3	11.5	0	2	10.1
Sundries.	0	0	6.5	0	0	7.7
Incidental expenses (less credits and receipts).	0	11	5.3	0	13	4.6
Total.	£2	14	2.9	£2	11	9.1

The above summary of the cost of treating the sewage for the year 1897 shows a reduction of 2s. 5.8d. per 1,000,000 gallons on the cost of treatment for the year 1896. The proportion of chemicals used during the year 1897 was: lime, 5.32 grains per gallon; sulphate of iron, 5.29 grains per gallon—total, 10.61. The quantities of lime and copperas used are adjusted by frequently testing the sewage after admixture with chemicals. The effluent is kept as far as possible faintly alkaline. For this purpose the

addition of a slight excess of lime is necessary, owing to subsidence and precipitation of carbonate of lime in the tanks. The amount of copperas added varies with the sewage, and is estimated by the character of the precipitation observed. The composition of the sewage varies within wide limits. The sewage begins to attain its maximum strength about noon on each day, and continues strong until midnight or a little after. The composition of the effluent does not vary so abruptly as that of the sewage, owing to the mixture of the sewage in the precipitation tanks. The effluent begins to attain its maximum strength about 2 o'clock in the afternoon.

The average amount of wet sludge precipitated in 1897 was equal to 21.16 tons per 1,000,000 gallons, as against 21.84 tons for the previous year, yielding 7 tons 12 cwt. of pressed cake per 1,000,000 gallons, as compared with 7 tons 18.4 cwt. for the year 1896. One ton of wet sludge equals 33.7 cubic feet, and 1 ton of pressed cake equals 32.12 cubic feet. The average proportion of wet to pressed sludge was at the rate of 2.73 to 1. The amount of lime used in pressing has averaged 1.40 per cent. by weight of wet sludge, and 3.83 per cent. by weight of pressed cake. The amount of sludge cake removed by farmers during 1897 was 14,233 tons, equal to an average of about 39 tons per day. The balance of 41,875 tons was deposited in a tip adjoining the works. The cost of pressing sludge during the year 1897 was 7.7d. per ton of wet sludge for labor, lime, cloths and sundries, but exclusive of cost of tip, repairs to presses, rolling stock and insurance.

The results of the measurements show that a considerable amount of moisture is retained in the filtering medium, and that this is slowly drained off or evaporated when the filter is allowed sufficient rest before refilling. The cinder filter has throughout given better results than the coke, both as regards the percentage reduction of impurity effected and in non-putrescibility.

The cost of conveying the sludge to the sea for the first three months of this year amounts to 6.2d. per ton of wet sludge, and includes wages, insurance of steamer, coal, repairs and incidental expenses and ship canal charges. Experiments have been continued since 1895 with coke and cinder filters. The capacities of these filters and of a coal filter as measured on several occasions are:

Date of Measurement.	Capacity in Gallons. Coke.	Cinder.	Coal.	Time of resting before measurement.
At commencement of use, in 1895.....	1,750	1,750	...	.....
April 26, 1897.....	1,296	1,260	756	1 hour.
April 28, "	1,332	1,404	828	8 hours.
May 27, "	1,380	1,477	...	17 hours.
July 2, "	1,446	1,548	...	15 hours.
July 2, "	1,425	1,476	...	2 hours.
July 2, "	1,404	1,476	...	2 hours.
October 6, "	...	...	*1,260	.....
January 5, 1898.....	1,260	1,350	...	2 hours.
January 6, "	1,278	1,368	...	2 hours.
January 7, "	...	...	1,026	.....
January 24, "	1,368	...	...	After a fortnight's rest.

To-day we shall have the opportunity of hearing several interesting papers read and discussed. I therefore feel that I must not unduly occupy the limited time at our disposal, and will content myself with directing your attention to the drawings before referred to, and to the photograph and models which have been placed here for your inspection.

BY-LAWS RELATING TO NEW STREETS AND BUILDINGS.

Mr. J. S. Pickering, surveyor of the Nuneaton Urban District Council, read a paper entitled "By-Laws Relating to New Streets and Buildings." He said it was scarcely possible within the limits of a short paper to make any detailed reference to by-laws affecting new streets and buildings. It was more with a view to elicit an expression of opinion on the subject generally that it was introduced. He proposed to refer more particularly to by-laws made in England, under the provisions of the Public Health Acts, rather than to by-laws made under local acts, but his remarks would, however, apply in some measure to by-laws relating to sanitary matters in general.

THE PUBLIC HEALTH ACT, 1875,

empowered sanitary authorities to make by-laws with respect to new streets and buildings, and repealed previous Acts under which such by-laws were made. It also provided that by-laws made

*The filters had been refilled with washed and screened material.

under those repealed Acts were to be deemed by-laws under the Act of 1875, if not inconsistent with the provisions of such Act.

In 1877 the Local Government Board drew up a "Model" series of by-laws for the guidance of local authorities. These had been somewhat amended from time to time, and had been framed with great care and under the best legal advice. What was also of the utmost importance, their provisions were considered to be in accordance with the statutory enactments by which they were authorized. But, notwithstanding these conditions, the Model By-Laws had not been received with general approval. It was true that by-laws made since the passing of the 1875 Act generally adhered closely—and in the greater number of cases almost word for word—to the "Model" series, but this was not so much on account of their general suitability to the districts for which they were adopted, as to the fact that the Local Government Board would not sanction any important departure from their "Model" code. The result was that many authorities did not possess any by-laws at all, others depended upon by-laws of doubtful validity made under former sanitary Acts, while the great majority did not enforce the particular by-laws they had been compelled to include in adopting the "Model" series.

"It is somewhat astonishing," said Mr. Pickering, "that this state of affairs should be allowed to continue with the extension of local government which has taken place in the country, and when there is a general desire on the part of local authorities to carry out the provisions of the Sanitary Acts. The varying circumstances of different districts make it impossible to frame a series of by-laws applicable to all. By-laws, for instance, affecting new streets and buildings in large towns would be altogether unsuited to the requirements of, say, the villages of rural districts. But obvious as this is, it is a matter which is overlooked and accounts for the absence of by-laws in many rural sanitary districts. Section 157 of the Public Health Act, 1875, provides that every urban authority *may* make by-laws with respect to the following matters: The level, width and construction of new streets, and the provision for the sewerage thereof; the structure of walls, foundations, roofs and chimneys of new buildings for securing stability and the prevention of fires, and for the purposes of health; the sufficiency of the space about buildings to secure a free circulation of air, the ventilation and drainage of buildings, and the closing of buildings unfit for habitation. Surely these

provisions are of sufficient importance to make their adoption imperative. Possibly twenty-three years ago, when the Act came into force, it would not have been desirable to make the adoption of by-laws compulsory, but, considering the advance of sanitary science since 1875, and the general determination of the community to live in greater comfort, and consequently under healthier conditions, there now appears to be no valid reason against the adoption of proper by-laws in every sanitary area. It is evident that the legislature do not accept this view, or they would not continue to make the adoption of important sanitary measures permissive on the part of local authorities." Speaking of

THE PUBLIC HEALTH ACTS AMENDMENT ACT, 1890,

Mr. Pickering said this Act contained many important provisions affecting the health of the community, but they could not be put into force without months of delay in complying with the wearisome details provided for in the adoption of the Act. Section 23 of this Act gave to sanitary authorities increased powers as to making by-laws affecting new streets and buildings. Under this section a by-law might be made with reference to the height of bedrooms, and other rooms used for human habitation. It seemed almost incredible that until the passing of the 1890 Act sanitary authorities had no control over the height of such rooms, although many authorities possessed a by-law fixing their minimum height. This was one of many by-laws inconsistent with the provisions of the Public Health Act, 1875, and therefore *ultra vires,* but it had been carried out as though it possessed full legal force. In many of the larger towns by-laws made under the Public Health Act, 1848, the Local Government Act, 1858, and other Acts repealed by the Public Health Act, 1875, had not been amended, though repugnant to the laws of the country, and the authorities possessing them preferred to retain these, trusting to their legality not being questioned, rather than adopt the more modern by-laws as sanctioned by the Local Government Board. This position on the part of local authorities should scarcely be possible; in any case, it should not be a necessary position to take up in order to secure by-laws adapted for the health and convenience of a district, for it must not be overlooked that many of these ancient by-laws, as in the case of the one referred to, were eminently desirable, whatever might be said of their validity from a legal point of view. By-laws made under Acts previous to the Public Health Act, 1875, were, as a rule, so conveniently elastic that this was

another reason given for their retention in preference to the rigid by-laws of the present day. The following were specimens of the by-laws in force in a town with a population of upward of 130,000:

"The walls of every new building shall be constructed of such thickness as shall be approved by the said council."

"The owner or occupier of every house shall provide proper ventilation in the drainage thereof by means of the rainwater pipe from the roof of the house, or by such other method as the said council shall direct."

These were, Mr. Pickering said, a striking contrast to the detailed by-laws referring to the thickness of walls and the ventilation of drains in the "Model" series, and yet they were only examples of similar by-laws in force in numerous large towns.

Another conveniently old by-law was one giving the authority discretionary power with respect to the enforcement of air space at the rear of buildings. The Local Government Board would not now sanction a new by-law which provided for this discretionary power. But most sanitary authorities, nevertheless, did not hesitate to exercise their discretion when an occasion arose, such, for instance, as in the pulling down and re-erection of a building where the provision of the by-law could not be adhered to without considerable sacrifice of property. It might, of course, be contended that the air space was necessary for the health of the occupants of a dwelling wherever the building was situated, and more especially in a populous district, where property as a rule is the most valuable. But an authority had often either to allow a building to be re-erected (and possibly improved from a sanitary point of view) without the requisite air space, or submit to it being altered in such a way that it would not come within the scope of the by-laws as a new building. Discretion in a case of this description seemed desirable, but it must be admitted that any general admission of discretionary power in the by-laws would probably result in frequent acts of indiscretion on the part of some authorities. By-laws of the "Model" series relating to the thickness of walls were seldom carried out in their entirety, especially where they had been adopted in the smaller towns and rural districts, where there was often a feeling that their enforcement might prejudicially affect the desirable growth of the district. So far as by-laws could be prepared to meet the varying conditions affecting the thickness of the walls of a building, the

"Model" by-laws did not appear to leave much to be desired. Possibly the thickness prescribed for the walls of small houses up to three stories might be somewhat modified to meet the objections usually raised against them in the smaller districts; but there would always be a difference of opinion as to what should be regarded as the reasonable and necessary strength of a building, and much would, of course, depend upon the quality of the material and workmanship. As the powers and privileges to make (and necessarily to enforce) by-laws under the Sanitary Acts have not been so fully appreciated as the framers of the Acts must have anticipated, it is a question as to the proper course to be adopted to bring about a better state of things. That it was desirable for all sanitary authorities to have proper by-laws affecting new streets and buildings there could be no doubt. However seldom it may be necessary to bring such by-laws into operation, they would be of service at some time or other, even in the most sparsely-populated districts. If, then, suitable by-laws were essential in rural districts, how much more important that populous towns should possess by-laws framed with the highest possible considerations for health and convenience. This, in the author's opinion, would only be brought about by the adoption of by-laws being made compulsory, and a greater latitude being given to sanitary authorities to frame by-laws adapted to their own particular districts. But the possession and value of by-laws would, however, be of little effect if the necessary means were not adopted for enforcing them. Even in districts where there was an apparent desire to see the by-laws strictly carried out, the surveyor's staff was generally so inadequate that the necessary amount of supervision could not be given. In the author's opinion no new house should be occupied without a certificate from the surveyor that it had been erected in accordance with the by-laws, and that it was fit for human habitation. It would be manifestly unfair, however, to expect a surveyor to give such a certificate unless he had satisfied himself by systematic and regular supervision on the part of a competent staff during building operations that such certificate was justified. Then, again, such a certificate could not be given where the by-laws were not enforced. In some of the older by-laws this certificate was required to be given, but it was not probable that a by-law would now be sanctioned to this effect. Indeed, it would scarcely be desirable until the necessity for a better supervision of new buildings was recognized by sanitary authorities.

BY-LAWS *versus* ACTS.

It appeared to the author that many provisions contained in by-laws might with advantage be incorporated in the Sanitary Acts, making them statutory enactments rather than measures to be adopted at the option of local authorities. It also seemed desirable that by-laws should be made less comprehensive, many matters of detail now included being made the subject of regulations varying according to the requirements of each particular district. Under these conditions a general series of by-laws more acceptable than the present "Model" series could probably be framed, and sanitary authorities would be able to include in their regulations many important matters, which would make by-laws cumbersome and unnecessarily lengthy. In the case of new streets, for instance, the by-laws might very properly lay down the requirements as to widths under various conditions, but the actual method of construction would be better dealt with in detailed regulations, forming a practical specification of the requirements. Then, again, matters connected with the drainage of a building could be more conveniently and in greater detail be referred to in regulations. It would add to the value of such regulations to accompany them with a complete set of descriptive drawings. Many authorities supplemented their by-laws with regulations as to drainage and other matters, but as these were not confirmed by the Local Government Board, and very frequently contained conditions which could not be legally enforced, they could not be said to be wholly satisfactory.

In concluding, Mr. Pickering said that in any revision of the "Model" by-laws, and the Acts under which they were framed, the Incorporated Association of Municipal and County Engineers might afford most valuable assistance. Throughout the Sanitary Acts and the "Model" series of by-laws there were many technical defects which the municipal surveyor could very readily rectify, and thus put an end to much unnecessary litigation. The Local Government Board in 1877 acknowledged the assistance rendered by the Royal Institute of British Architects, in framing the by-laws dealing with new streets and buildings, and they would no doubt equally value the help of a professional body whose members must, by their every-day experience, possess a most intimate knowledge of the subject. It was to be hoped that the time was not far distant when every sanitary authority in the country would be in possession of by-laws which it would be

deemed a duty to carry out in the interests of the health of the community.

Dr. J. F. J. SYKES, Medical Officer of Health to the St. Pancras Vestry, and Mr. PETER ADDIE, F. S. I., lately the manager of the Birmingham Improvement Scheme, followed with papers on the same subject.

Dr. Sykes in his paper said it was profitable to review the subject from a social as well as a structural aspect, since usage and sanitary precautions must form the basis of structural accommodation. He proceeded to point out that the functions and requirements to be provided for the individual in the modern dwelling were in approximate order of greatest necessity: (1) sleeping, (2) food storage, (3) cooking, (4) warming, (5) excretion, (6) ablution, (7) clothes washing, (8) deposit of refuse, (9) open space for refuse, drying clothes, etc., (10) bathing, not partial but total ablution of the body, and (11) living, including reading, writing, work, recreation, etc., for brevity called "living." In the next place it was advisable to picture the possibilities, whether desirable or not, of the case of a single individual living in one room, and the provision that would be necessary if separate rooms or places were required for the purposes mentioned. These points were thrown by Dr. Sykes very neatly into tabular form. In the first column the various purposes to be provided for were enumerated as follows: Living, sleeping, food storage, cooking and warming, ablution, clothes washing, bathing, deposit of refuse, and an open space (for drying clothes and storing refuse). The provision in a single room for these purposes would be: Table and chairs, bed, cupboard (ventilated into open air), range, draw-tap and sink, wash-tub, bath or tub, pail, and window-sill. The corresponding provision in separate places would be: Parlor, bed-room, larder, kitchen, scullery, wash-house with copper, bath-room, bin, and yard or balcony. The water-closet, it was pointed out, must in any case be provided for separately. As not only individuals, but whole families, in our cities and large towns existed in single rooms under such conditions, it was necessary to forms some idea of the

PROVISION REQUIRED

to be made for those who had neither the means nor the knowledge to provide for themselves. In providing dwelling accommodation healthy family life should, above all things, be most en-

couraged and bettered, and no amount of collective accommodation for men only or women only would touch that great question. The two-roomed dwelling was the very minimum family accommodation possible; but it must be recognized that family life entirely carried on in two rooms could not be regarded as the standard of "home" in which the bulk of the young population of the nation should be reared and trained as future citizens, however humble their walk in life. As both of these rooms might, sooner or later, require to be used as bed-rooms, they must further consider how the second room may have removed from it such provision as might be made elsewhere. Food storage, cooking and warming, ablution and clothes washing might be so removed to a combined kitchen, larder, scullery and wash-house, and so they reached a three-roomed self-contained dwelling. The possibility of installing a food cupboard, a cooking range, a draw-tap and sink and a washing copper in the same room must be admitted. The combination of kitchen, larder, scullery and wash-house had this great disadvantage—that the room being applied to so many purposes it could not well be used for any other. The separation of this into two rooms, a scullery and a kitchen, enabled the kitchen to be freed from the other purposes and to be usable as a living-room, this in turn dispensing with a bed-room being so used, as must of necessity otherwise be the case. Here, then, they reached the four-roomed self-contained family dwelling. In proof of the fact that progress is being made in this direction, Dr. Sykes quoted some extremely interesting figures drawn up by Dr. J. B. Russell, the well-known medical officer of health of Glasgow, showing that during the last quarter of a century there had in that city been a steady increase in the percentage of the population living in two, three and four rooms, and a corresponding decrease in the percentage of those in one room and also in the case of those living in five rooms and upward. The number of people living in four-room dwellings, as well as those in three-room dwellings, showed a continuous and increasing proportion, the greatest gain of all being ultimately in the three-room dwellings. But the remarkable point was that, whereas in the decennium 1871-81 the proportion of persons living in two-room dwellings increased 3.2 per cent., and the proportion in three-room 2.8, in the decennium 1881-91 the proportion in two-room dwellings only increased 2.8, whereas the proportion in three rooms rose 3.7 per cent. Above all towered the notable fact that the proportion of persons living

in one-room dwellings fell between 1871 and 1897 from 30.4 to 18.0 per cent. of the total number of the population, and it was significant that the increase of proportion appeared to be converging toward the three and four-roomed dwelling. Unfortunately, no such valuable comparative figures were available for England and Wales, or any English towns, Dr. J. B. Russell's method having only been adopted at the last census in 1891, but he presented a table showing the percentage of population in one, two, three and four rooms in the whole of England and Wales, in the rural districts, in the urban districts, in St. Luke's, one of the most crowded, and in Lewisham, one of the least crowded districts in London. Comparing the St. Luke's figures with those of Glasgow, Dr. Sykes pointed out that the former had about the same proportion of population housed in three rooms, and a slightly larger proportion in four rooms, a very much larger proportion in five rooms and over, and a much smaller proportion in two rooms, but a somewhat larger proportion in one room. Comparing Lewisham with St. Luke's, the great difference was that in Lewisham 53.8 per cent. less of the population lived in one and two rooms and 55.8 per cent. more in five or more rooms than in St. Luke's. That, no doubt, was due to the difference between the classes inhabiting a semi-rural and choice residential suburban area as compared with a crowded central area in a large city. After a reference to the difficulty of accurately estimating the normal proportion of urban population living in several-roomed houses, Dr. Sykes proceeded to consider whether it was possible to reduce

THE NUMBER OF ROOMS

in the ideal self-contained large family dwelling of four rooms—namely, two bed-rooms, a kitchen and a living-room, a scullery, wash-house and larder, and a water-closet, with yard or balcony. If the family were very small one bed-room might suffice, and the number of rooms be reduced to three, constituting what might be regarded as the ideal self-contained family dwelling. Could any further reduction be made, and how? At some sacrifice of family life and independence in the construction of buildings containing numerous dwellings, another room might be lopped off by setting the larder in the kitchen wall, opening to the air, and constructing a scullery and wash-house for the common use of several families, and where that form of construction was adopted the water-closets

were treated in a similar manner. In some cases the scullery was also separated from the wash-house, the scullery being placed close to the dwellings and the wash-houses collected together at a distance. That class of dwellings might be better known as associated dwellings, in contra-distinction to self-contained dwellings. It was important that the water-tap and the water-closet should be as nearly accessible to the dwellings they served as possible, in every case on the same floor of the building, and that such provision should be made for every twelve occupants or less. The water supply and drainage should strictly conform with official regulations, for in buildings in which the number of occupants was multiplied the danger incident to defects was proportionately increased. Proceeding to refer to

VENTILATION,

Dr. Sykes said that some years ago Dr. Arthur Newsholme, in a paper read before the Royal Statistical Society, showed that in London houses constructed in separate dwellings or common-stair dwelling-houses appeared statistically not to have any particular influence upon health except in this respect—that they produced a greater prevalence of those forms of infectious diseases for which there was no hospital provision, such as measles, whooping-cough, etc. The lesson to be learned from these statistical researches was that the staircases and passages of such houses must be so constructed as to be fully and permanently open to the outer air. That necessity was the more obvious when it was pictured that the separate dwelling all open on to the common stair and passages, and that the dwelling-rooms of each dwelling were also all in direct aërial communication with each other and were not separated by a ventilated staircase-well, as in the older type of house. The statistical researches of Dr. Tatham, superintendent of statistics of Somerset House, when medical officer of health for Manchester, into the mortality and morbidity of back-to-back houses furthermore pointed to the necessity for having through ventilation to each dwelling—that is, that a back-to-back type must not be adopted, but that one or more of the rooms must be situated on the opposite front of the building to the other room or rooms, so as to allow of thorough perflation when windows and doors were opened. In this connection it need scarcely be added no water-closet should have direct aërial communication with any room of a dwelling, and especially where the rooms were in direct

aërial communication with each other, and, furthermore, that that every dwelling should have close access to a modicum of open space, in the form of a yard or balcony, wherein to place refuse or any objectionable matters and for other purposes. In planning, this open space might be made the means of cutting off the water-closet from aërial communication with the dwelling. As to open spaces at the front and rear of the building, it was now accepted that these should be as wide, and might be as wide again, as the height of the house. The erection of baths in corridors and spare corners had not met with successful application, and the only provision that appeared to succeed in large blocks of separate dwellings was the erection of a separate building, fitted with baths and furnished with hot and cold water under the care of an attendant. To that building also might be conveniently added another containing the wash-houses of associated dwellings. The concluding part of the paper was devoted to the question of

CUBIC SPACE,

which divided itself into (1) the cubic capacity or size of dwelling-rooms, and (2) the cubic space per head. Although it had been necessary for the purpose of lucid description to regard a scullery and wash-house as a room, it was not a fit place for living or sleeping in, and could not be included in the term dwelling-room. One of the principal points governing the size of dwelling-rooms was the means of ventilation, and the smaller a room the greater the difficulty of ventilating it, so that restriction must be placed upon the reduction of size in new buildings. The standard height now generally adopted was 9 feet and the minimum area 96 square feet, say 12 feet by 8 feet, or 11 feet by 9 feet, or 10 feet by 10 feet, a cubic capacity of something under 900 cubic feet. The cubic space per head was the most difficult point of all to deal with in practice, and must be regarded sanitarily as the most important. In 1851 the Common Lodging-Houses Act was passed, which placed the control of common lodging-houses in the hands of the police, with power to make by-laws. At that period there was no doubt some difficulty in fixing the minimum amount of cubic space per head to be enforced, and it appeared to have been fixed successively at 240, 260, 280 and 300 cubic feet, at which point it stood at present. It would be interesting to know how this amount was reached, and it was a curious coincidence that if they measured a bedstead 6 feet long with a 2 foot gang-

way at the bottom and 2½ feet wide with a 1½ foot gangway at the side, they arrived at an area of 8 feet by 4 feet, the minimum amount of floor space in which it was possible to put an approachable bedstead, and if that be multiplied by 7½ feet, the minimum height probably adopted at that period, since cellar dwellings of a less height than 7 feet were illegal, they arrived at a cubic space of 240 cubic feet, and it required but the addition of a few inches to each dimension to raise that space to 260, 280 and 300 cubic feet. It was highly probable, therefore, that that minimum was a purely mechanical calculation in packing, the requirement of the human subject being overlooked; 300 cubic feet still remained the minimum standard of cubic space for sleeping-rooms. It was true that a recent Factory and Workshop Act only provided for 250 cubic feet per head, but a person awake had more control over the condition of the air breathed than a person asleep for perhaps eight hours at a stretch. The Local Government Board's Model By-Laws provided for 400 cubic feet in tenement-rooms, used both for living and sleeping, and the 300 was recommended to be increased in the dormitories of common lodging-houses that might require it. Many years ago the late Dr. Edmund Parkes showed that, calculated on a physiological basis, the human adult required 10,008 cubic feet of space, because in order to maintain the air in a sufficient state of average purity in a dwelling-room it was necessary to supply 3,000 cubic feet of air per hour, and the air in this climate could not be changed more often than three times per hour. The medical profession were now strongly advocating the *cure* and *mitigation* of consumption, or tubercular phthisis—essentially a disease spread by crowding—by fresh air treatment. Was it out of place to advocate even more strenuously the *prevention* of the disease by fresh air, by the provision of more cubic space, and especially by raising the present inadequate minimum standard? The adoption of the maximum as a working standard was scarcely practicable, but it was practicable to advance the minimum standard to 400 cubic feet at the very least in all cases, and if the lauded fresh air treatment meant anything, it meant, firstly, a decided step in that direction. A standard of two persons per room was adopted in schemes for re-housing and in census returns for measuring overcrowding. With regard to the latter, it gave no idea of the amount of cubic space per head, inasmuch as the sizes of the rooms were not known. In reference to the former, to design dwellings allowing 500, 600 or 700

cubic feet per head, without providing any means of preventing that allowance to be reduced, was practically futile. Dr. Sykes concluded his paper with a further plea in favor of increasing the minimum limit.

Mr. ADDIE, whose paper was entitled *"The Removal of Insanitary Areas and the Management of Improvement Schemes under the Housing of the Working Classes Act,"* said that most of the improvement schemes were carried out under the Artisans' and Laborers' Dwellings Improvement Act, 38 and 39 Vic., and the Housing of the Working Classes Act, 53 and 54 Vic, and then proceeded to give details of schemes carried out at Swansea and Birmingham, both of which towns had adopted the 1875 Act immediately after its passing. In the case of the Swansea scheme a very heavy charge remained, but an undesirable colony had been removed from the centre of the town, a marked improvement made upon the death rate of that particular area (40 per 1,000), the ratable value had been increased, and a continual source of complaint, both as to health and crime, absolutely abolished. What was known as Alexandra-road was evolved and cut through a very squalid and dilapidated area. It included 14 acres, 3 acres of which were devoted to streets. The usual stipulation was made for the housing of the disturbed population, but it was shown that local enterprise was sufficient in the undeveloped portions of the borough to provide for the people displaced, and the scheme was accordingly modified and the salvages were relieved from the embargo of being used only for the purpose of the re-erection of artisans' dwellings. The cost of the scheme was estimated to be—for the property required, £79,166, and the estimated value of salvages and houses not taken down was £67,078. Deducted from this was the corporation interest in property to be taken in the Greenhill district—viz., £1,044—leaving an estimated permanent charge to the borough of £11,044. That amount, however, was very much exceeded, the actual amount borrowed for the purposes being £120,000. In

THE BIRMINGHAM SCHEME

the area dealt with was 45 acres, of which 9 acres were used for new streets. In St. Mary's ward the death rate was 26.82 per 1,000, as compared with 13.11 in Edgbaston ward. Corporation Street, the principal thoroughfare, was begun in August, 1878,

and completed for traffic early in 1882. The width of the street was ultimately fixed at 66 feet, of which each footway absorbed 14 feet. The length of the portion now opened was 851 yards. The length of the section still to be made was 633 yards, making a total length of 1,484 yards. Several other new streets had been constructed and others materially widened. During the progress of the scheme it was found necessary to obtain modification orders, varying the powers originally given, but no unnecessary difficulties were raised by the confirming authority. For the accommodation of persons of the laboring classes displaced by the scheme an outlying area lying between Newton Row and Summer Lane was acquired, and upon the site sixty-two workmen's houses and twenty retail shops had been erected by lessees of the corporation. Upon the land in the area set apart for the erection of similar dwellings 103 houses had been erected by the corporation. The total quantity of land purchased was 218,099 square yards, or about 45 acres. This had been disposed of as follows, the figures, of course, denoting square yards: Let on building lease, 57,872; sold or exchanged, 17,393; site of Victoria-courts, 5,600; site of artisans' dwellings in Ryder Street, 9,766; required for new streets and widening old ones, 40,526; still occupied by rent-producing property, 76,375; cleared for letting, 10,567. About 1,867 houses and 814 other buildings had been acquired, and of these 1,002 houses and 427 other buildings had been taken down. Fifty-seven licensed premises were included in the above, and up to the present time twenty-three had been abandoned, the remainder being still in existence or transferred to new buildings erected upon the area. The town clerk of Birmingham, in a paper read to the Royal Statistical Society on the

FINANCIAL ASPECT

of the scheme, said: "The dwelling-house improvement fund, created under the Artisans' and Laborers' Dwellings Act and order, has been a great cost to the corporation, but the results have amply justified the expenditure." The Dwelling-House Improvement Account at March 31, 1898, was as follows: Net expenditure on general capital account, £1,551,137; net expenditure on artisans' dwellings, £18,000; deficiency on revenue account accumulated during the years 1880-92, now capitalized, £117,011; the total net expenditure on capital account being thus £1,686,148. The money required for the scheme was borrowed for a term of

sixty years, with the exception of the £18,000 expended on the erection of the artisans' dwellings, which was borrowed partly for forty and partly for fifty years. An amount was provided from income each year for the repayment of these loans sufficient to repay the whole within the periods for which they had been borrowed. The amount set aside for the purpose last year was £15,523, and the total amount so provided since the commencement of the scheme was £221,977, and the sum deducted from the net capital expenditure as above left the present liability in respect of the undertaking at £1,464,171. In return for the large expenditure the corporation were now in possession of an income from well-secured ground rents amounting to about £41,000 per annum, which would be further increased during the next four years (without any new lettings) to about £43,000 per annum, but from that figure must be deducted a rent charge of £3,000 payable in respect of property acquired from the trustees of King Edward VI. Grammar School, leaving the net income from ground rents at £40,000 per annum. A rental of about £18,500 per annum was also being derived from the shops, houses and other buildings still standing on the improvement area, and after deducting £4,000 from that item in respect of rates, repairs and other outgoings, a net income was available from that source of about £14,500 per annum. There was still some uncleared land unlet and near Corporation Street which was at present producing no rental, but it was estimated that that would bring in, sooner or later, a further income of about £1,000 per annum. On the other hand, interest on loans, sinking fund charges and management expenses entailed a total outgoing of about £69,000 per annum, which was £16,500 in excess of the present income. That deficiency had to be provided from the rates, and since the scheme was initiated in 1876 sums varying from £460 in 1876 to £25,000 in 1891, and £17,000 in 1898-99, and making a total up to the present time of £234,607, had been provided by the ratepayers. The annual contributions from the rates would continue to be reduced every year until the loans were paid off—about forty-four years hence. The undertaking would then be free of charge, and the whole of the net rental income of, say, £53,000 per annum, could be carried to the credit of the funds of the city. The town clerk had pointed out that the income would be further increased some fifteen years later by the expiration of the leases which were for seventy-five years, and the consequent reversion to the corporation of the valu-

able land with the costly buildings that had been erected thereon in Corporation Street and the adjoining thoroughfares; and that if no great change took place in the value of property in the city during the interval it might be safely assumed that the corporation will then be in possession of a clear income of over £100,000 per annum from the scheme. From calculations made by the town clerk it appeared that if the £100,000 per annum, the ultimate estimated rental, were capitalized at 3 per cent., and the necessary deduction made for the difference in date at which the full benefit accrued, the result would be about £3,000,000, or about the same sum as the contributions from the rates would realize at 3 per cent. compound interest. The town clerk had further said that the scheme would, in fact, have formed a kind of savings bank for the benefit of posterity, while the sacrifice made by the present ratepayers had had its reward in the street improvements, increased ratable value, vastly improved sanitary condition of the area, involving a greatly decreased death rate, and the impetus that had been given by the construction of the new streets to the trade of the city and the general circulation of money occasioned by the improvements. The corporations had themselves erected workmen's dwellings for the working classes on the area acquired. They would gladly have allowed private persons to provide suitable dwellings for the working class on the cleared ground, but, with the exception of the land on which the sixty-two houses mentioned were erected, none was let for the purpose. It was consequently proposed by the Improvement Committee that the corporation should sanction the expenditure of £5,250 on the erection of a block of model dwellings on the flat system, but that proposal was not accepted. Some time afterward the council sanctioned the erection of twenty-two through cottages before mentioned, at an estimated cost of £4,000. These dwellings were at once let to respectable tenants at 5s. 6d. per week. The applications were largely in excess of the number of houses. Encouraged by the first experiment, the corporation afterwards embarked in the erection of eighty-one additional artisans' dwellings, at a cost of about £14,000. These houses were similar to those previously built, their accommodation consisting of a front living-room, 13 feet by 12 feet 6 inches; front bed-room, first floor, 13 feet by 12 feet 6 inches; kitchen, 12 feet by 9 feet; back bed-room, 12 feet by 9 feet; and attic, 13 feet by 13 feet; a separate water-closet being provided for each family. There was an asphalted

or concreted yard common to each block, and wash-houses in proportion to the number of dwellings. These houses were let at rents of 5s., 5s. 6d. and 6s. per week, and produced a net income of £790 per annum, which, after providing for the interest and sinking fund, was sufficient to pay an average ground rent, spread over seventy-five years, of 10d. per square yard per annum. The Local Government Board always insisted on the erection of dwellings for the working classes on the area acquired. Mr. Addie then proceeded to give a few particulars of the

DIFFERENT KINDS OF DWELLINGS

that had come under his notice. The dwellings erected by the Birmingham Corporation in Ryder Street he had already described. In Dublin the corporation erected five-story flats, dual houses and one-story cottages. In Liverpool five and six-story flats, and in Manchester the same course was followed; but in each of these cities huge flats had been abandoned, and the dual houses were now in favor. In London the flat system, by reason of the scarcity of land, seemed imperative. Under the Act of 1890 the Birmingham Corporation had formulated a small scheme for the removal of an unsanitary area in Milk Street, the site being very near to the centre of the town. The acquisition of the land and of the buildings necessitated an expenditure of about £6,000. Under the provisional order the corporation were required to house 170 persons of the working classes, and for that purpose the city council had recently adopted plans, prepared by his successor, Mr. Tart, on the dual house principle. The plans now awaited the sanction of the Local Government Board. The tenements were arranged in four terraces, and comprised twenty-four houses, each containing one living-room and one bed-room, and thirty-seven containing more than one bed-room. The rooms averaged: Living-room, 13 feet 4 inches by 14 feet; bed-room, 8 feet 2 inches by 14 feet; and bed-room, 9 feet by 9 feet, the smaller bed-room being designed for children only. The rents had been fixed at 1s. 6d. per week per living-rooms, that is 3s. and 4s. 6d. per dwelling. Each tenement would be provided with a separate water-closet, scullery accommodation and ash receptacle. It would be noticed that the upper story was approached by a balcony, and that design permitted each door and window to have the maximum sunlight and air. The financial aspect of the Milk Street scheme was: Estimated cost of building, including paving, etc., £8,975; road-making, £146; contingencies, £897; and land at

5s. per yard (4,030 yards), £1,007; giving a total of £11,025. The estimated annual statement would be: Estimated rental, £659 2s.; outgoings, £219 14s.; giving a balance of £439 8s., against which had to be put interest and sinking fund on £11,025, amounting to £441. The Improvement Committee, in reporting to the council, had said: "The cost of the Milk Street site was £6,000. Deducting from this sum the £1,007 charged to the houses, leaves £4,993 to be provided for. The interest and sinking fund will amount to £199, and this annual payment from the rates must be considered as the city's payment for the sanitary improvement thus made." Mr. Addie devoted the latter part of his paper to some interesting general observations. As municipal representatives were aware, the housing of the working classes was

A MOST DIFFICULT PROBLEM,

and any scheme which was formulated received considerable opposition. It was difficult to provide for a population of so diverse a character as the working classes. What he might term the respectable element was hampered and weighed down by a number of thriftless and unclean people who abused any provision which was made for them. Possibly that difficulty might be removed in the future by universal education, but he was afraid that many years would elapse before the dwellings which municipalities so liberally provided would be appreciated and used to the best advantage. He would add a word or two with reference to the second and third parts of the Act. Part II. was utilized at present by local authorities for the purpose of closing isolated houses, or groups of houses, which were unfit for habitation because their condition was dangerous or injurious to health. He was afraid that the operations of authorities were frequently hindered by the reluctance which magistrates sometimes exhibited in making the necessary orders. In many instances the justices appeared to disregard the evidence of medical men and surveyors skilled in the subject; and as the authorities had no power to appeal against the magistrate's decision, a great many unsanitary dwellings continued to exist. There could be no doubt that that was one of the greatest blots on the Act, and until it was removed no lasting and permanent benefit could ensue. The subject of appeal had, he believed, been discussed by the Municipal Corporations Association at the instance of the Nottingham Corporation, and he sincerely trusted that some result might follow their deliberations. This part of the Act also provided machinery to enable local au-

thorities to purchase houses, in order to open up alleys and courts. If a medical officer found that any building, although not in itself unfit for habitation, was so situated that by reason of its proximity to, or contact with, any other buildings it stopped ventilation, or conduced to other buildings being unfit for habitation, or if it prevented proper measures being carried out to remedy a nuisance which was injurious to health, he might represent such first-mentioned building as an obstructive building, whereupon the local authority might take steps to secure its removal. It was worthy of note that the local authority would only have to pay compensation for the actual space taken, and would not be obliged to buy the whole of the owner's land, but would only bear the cost of the severance. Under the third part of the Act the local authority was empowered to provide lodging-houses or cottages for the working classes. Several municipalities have acted under this part of the act—viz., Manchester, Southampton, Glascow, etc. It was, however, beyond the scope of his paper to discuss the character of the buildings provided. Mr. Addie's

CONCLUDING REMARKS

were as follows: "I can only add that it is a matter of deep regret that many of the houses inhabited by the working class are not in the state of repair they should be, and that infectious diseases claim the majority of their victims from these houses. A wide field is offered in most towns for the application of both part one and part two of the Act; for there is no doubt that, as the landlords execute as few repairs as possible, the decay of the property increases year by year, and the classes of tenants thereby degenerate. If the local authority do not step in area after area besomes unsanitary. In many of our large towns there exist courts and alleys without number where perpetrators of crime and vice congregate. It is to be earnestly hoped that municipal representatives will study closely the provision of the Housing of the Working Classes Act, so that these plague spots may be abolished, light and air admitted, and the lives of the workingmen rendered brighter and happier.

DISCUSSION.

Dr. Sykes' and Mr. Addie's papers were discussed together, and in opening the debate Alderman Cook, the president of the conference, said the great trouble was in clearing the sites. All manner of difficulties had to be encountered in clearing the land.

The only way of getting rid of these plague spots, however, was for the municipal authorities to take the land over.

The papers were further discussed at some length, most of the speakers agreeing that the great thing needed was provision for the very poor, and that those who could pay 4s. 6d. a week could obtain proper accommodations, as a rule, without the intervention of the local authorities. The need of a legal definition of overcrowding and of legal provision for the prevention of the evil was also generally emphasized.

The President said that in the latest scheme the Birmingham Corporation altogether ignored the term "artisan" and working classes" and went in boldly for a scheme for the laboring classes. The committee estimated the loss at £200 a year, and the council adopted the scheme unanimously.

In the course of the replies of the readers of the papers Mr. Addie met with sympathy in his remark that the Local Government Board had been a great stumbling-block, and had put the drag on the wheel of all enterprise and public spirit in the housing of the poor.

Alderman Sutton (chairman of the Health Committee of Warrington) felt so strongly on the subject that he suggested a resolution asking the legislature to consider the necessity of passing a law to enable corporations to provide suitable dwellings for the very poor, and to compel them to reside in such dwellings when so provided. The latter clause provoked considerable laughter, and the chairman ruled the proposition out of order.

HOUSE DRAINAGE AND SEWERAGE.

Several of the addresses contributed at the Birmingham congress of the Sanitary Institute dealt with questions connected with house drains and with sewers.

TYPHOID AND CLOSETS.

Mr. Philip Boobbyer, M. B., the medical officer of Nottingham, read a paper on "Typhoid Fever." He sought by means of diagrams and statistics to demonstrate the effects of privies and water-closets respectively in the spread of that disease. In Nottingham, during the last ten years, he said, the average rate of disease was one in every 120 houses fitted with pail-closets, one in thirty-seven houses fitted with privies, and one in every 555 houses fitted with water-closets.

Dr. Cooper Pattin (Norwich) expressed similar views from his experience of that city, and Dr. Eustace Hill, medical officer of health for the county of Durham, a son of Birmingham's medical officer, emphasized the fact that nowadays it was becoming recognized more generally in the profession that typhoid was spread by other means than in a defective water or milk supply. He quite agreed that endemic typhoid was encouraged by the conditions to which Dr. Boobbyer had alluded, and, apart from soil pollution, thought that flies were frequently the means of carrying the germs of typhoid.

Dr. Scurfield (Sunderland) added his testimony to that of Dr. Hill, and thought the conditions under which colliers existed in the mining districts might be responsible for certain soil contamination.

Dr. A. Waters (Southend) thought that after all they had heard about the causes of typhoid it would be well if someone would suggest a practical way of dealing with the matter.

Dr. Charles Porter (Stockport) declared that General Phelps' suggestion that the typhoid germ might be carried in vaccine lymph was the most novel he had ever heard. It was, however, a remarkable fact, established by statistics he had compiled in Stockport, that the incidence of endemic typhoid was greater as the ratable value of the houses increased.

Mr. R. H. Williams (St. Austell) asked what means could be suggested to force local authorities, landlords and others to promote those sanitary measures beneficial to the preservation of health.

Dr. Clare (Hanley) said his experience was that typhoid was more frequent where pail-closets existed.

Mr. Baker (Maidstone) asked for information as to whether chemical analysis could be relied upon to protect a town from an epidemic of typhoid.

Dr. Boobbyer, having replied to the points raised in the discussion, the chairman (Dr. Alfred Hill) pointed out that no analysis of water would reveal the presence of typhoid poison. Bacteriology and chemistry might be made use of as far as possible, but in conjunction with these two methods it was necessary to look to the surroundings of the source of the supply.

INTERCEPTORS AND TRAPS.

Mr. W. Henman, F. R. I. B. A., sketched the evolution of domestic sanitation, and predicted that the day would come when

all interceptors and traps would be abolished, and with them the sewer-gas which they retained about our dwellings. With good ventilation of house drains, air inlets to sewers, ample flushing, impervious and well-laid drains and sewers, all entrapped and free from obstruction, gas, he asserted, might become a thing of the past. Engineers had sinned deeply in the construction of sewers. Apart from their general design and the method of construction and gradients adopted, the work had too often been defective in execution, so that, instead of aiding the quick removal of solids by water carriage, they had acted as filters or separators, permitting the fluids to escape and soak into the ground, or to run off and leave the solids to fester and become offensive.

Prof. A. Bostock Hill, M. D., D. P. H., read a paper on

THE CONSTRUCTION AND VENTILATION OF HOUSE DRAINS.

In opening his paper he remarked that it might at first sight be thought that a subject like this in the present stage of sanitary science had been definitely settled, but, as a matter of fact, we found that on some points authorities still held divergent views. The questions of amount of fall, materials of pipes, etc., no doubt were agreed upon; but certain other points gave rise to controversy on different forms of procedure in different districts. He had not the least intention to occupy their time by reiterating those parts of the subject upon which all were agreed, but he desired for a few moments to call attention to certain points, especially in connection with what were known as compound drains, more particularly as this subject had had of late a local interest. This question of the relation of house drains to so-called compound drains and sewers had been forced on public attention by certain well-known decisions of the High Court, decisions given mainly to settle the point, What is a drain and what is a sewer? The subject was of importance, because sewers, by section 13 of the Public Health Act, were vested in the local authority, while drains, of course, were the property of the private individual. He then proceeded as follows:

"In the past, at all events in the Midlands, it has been customary for the small contributory drains from a row of houses to join a larger one which connects with the public sewer. Most of the difficulties have arisen in cases of this kind. As regards the construction of these drains, the size and methods of disconnec-

tion and ventilation are the chief points to be considered. As to size of drains, the smalles which will convey the necessary quantity of liquid is certainly best for reasons of cleanliness. From a single house a four-inch pipe is ample, yet I have been surprised to find that in case of recently-erected cottages a six-inch pipe has been insisted upon by some surveyors, and, as far as I can understand, the only reason urged for this is the less likelihood of the pipe becoming blocked. But even if this be true, which I take leave to doubt, there are many corresponding disadvantages. From small houses the soiled water chiefly comes down in gushes, the pipe itself, if it be as much as six inches, is never nearly filled, but the sides get splashed, and they are in a very short time dirty and have on their surfaces matter in a state of putrefaction. Again, it is impossible to flush a pipe as large as six inches coming from a single small house; so that, although such a pipe may not become so frequently stopped up, still it is in a condition in which sanitary science has conclusively proved a house drain should not be.

DISCONNECTION AND VENTILATION.

It is, however, on the questions of disconnection and ventilation that the greatest differences occur. The by-laws in many towns state that every drain shall be cut off by an intercepting trap from the sewer. The judges have decided that a so-called compound drain on private property is a sewer. Therefore, say certain authorities, we must insist on the presence of an interception trap between each of the contributory drains and the common drain, which has become a sewer. Let us suppose, for the sake of argument, that legally a compound drain, though on private ground, is a sewer. As the by-laws were formulated some years previous to the legal decision, we may take it as at least doubtful whether the compound drain was intended by the sanitary advisers of those who framed the by-laws to be so considered; and we may also consider whether, though legally a sewer, it is desirable, from a sanitary point of view, to treat it as such as regards our methods of interception and ventilation. Let us consider this for a few moments. The object of a drain is to remove, as quickly as possible, from the neighborhood of the dwelling foul water which has passed into it. The law here steps in, and those who choose to consider it binding insist that at each junction of the sub-drain with the compound drain (legally a sewer) there shall be a disconnecting trap between the house drain and the

compound drain, so that in a row of six houses we shall have six intercepting traps between the various sub-drains and the compound drain. Each of these traps holds a considerable quantity of liquid and solid matter, and as a trap is an obstruction to the regular flow of the liquid passing through the drain, each of these syphons becomes for the time being a small depositing tank where solids in suspension precipitate themselves. The compound drain is treated in one of two ways: Either it is made to discharge into the street sewer without an intercepting trap at all, and connected with a ventilating shaft running up to the roof of one or more houses, or else an intercepting trap is put just where it enters the road, an air inlet as in the case of the other traps being provided, and a ventilating shaft being taken from it at or near its highest point. In the latter case we ventilate only that part of the sewer which is on private property. In the former case we utilize private property for the ventilation to some extent at least of the public sewer.

Under this system, which I regret to say is becoming common in many instances in the Midlands in new property, the following must of necessity occur. Each of the syphons on the branch drain holds foul water; in the case of the house having a water-closet, which is the rule at the present time, the trap holds fæcal matter as well. The inlet, which is on the drain just on the house side of the interception trap and which, when no water is coming down, may act as such, becomes an outlet every time a flush of water is sent down, and the fouled air, which the length of house drain contained, coupled with the gas which has been given off by the fouled matters in the trap, is discharged into the air in close proximity (in some instances not more than 6 feet or 7 feet) to the back-doors of the houses.

"My experience, then, is that from these so-called inlets, acting frequently as outlets, constant smells from foul gases arise, and I have had ample evidence that the tenants complain loudly of the existing state of things. The diagram which I have here shows an actual occurrence observed by a sanitary official in Birmingham, where it will be seen that the so-called inlet is being used as an outlet, while the flushing of the closet is performing the function of a bellows, and thus enabling the children of the cottages to amuse themselves by utilizing the soiled air from the house drain for the purpose of blowing up their miniature bonfire.

"In a close and crowded nighborhood such a condition of things is undoubtedly bad, even if there be no specifically contaminated matter in the drains; but in the case, say, of typhoid fever existing in property drained in this way, it seems to me that, even if disinfection of stools had been carried out in the best-known possible way, there would be considerable risk of further dissemination of the disease. It is certainly undesirable to store the sewage, even for a short time, near the premises; and I am strongly of opinion that the method which I have described, while no doubt complying with the letter of the law, induces a state of things, from the sanitary point of view, very much worse than the system which it superseded. I have known of instances where, to avoid the odors arising from these so-called inlets in front of the intercepting trap, tenants have on their own account stopped up the opening, and under the circumstances, in my opinion, they are quite justified in doing so.

VENTILATION OF DRAINS AND SEWERS.

"Closely connected with this question is that of the ventilation of drains and sewers. I have been somewhat surprised to find that many surveyors at the present time are recommending the ventilation of sewers up houses on private ground. Such a proceeding is—and as, I believe, I have shown on other occasions—attended with considerable danger to health; and I wish to enter here a protest against a method which I believe to be utterly wrong in principle, and which tends to distract public attention from the real source of the nuisance, and which palliates an evil instead of removing it. It is common knowledge that nearly all newly-laid sewers on the separate system, if they be ventilated by ventilators at the crown of the road, are, when first put into operation, a nuisance to the public. It is equally well known, I believe, that the cause of this nuisance is the stagnation of sewage, the deposition of solids in some portion of the sewer, consequent putrefaction, and the production of offensive gases, so that when a sewer gives offence to the nose it is a sign that it is not doing what it was intended to do—viz., carry fresh sewage, which in itself is always inoffensive. When this state of things occurs the public demands that the nuisance be abated. Owing to the very large number of schemes which have been completed of late in the smaller towns and rural districts these complaints have become quite common, and there has been a tendency, which I con-

sider to be unscientific, to endeavor to remove the nuisance from the nose, instead of removing the cause which produces it.

THE MUNICIPAL ENGINEER AND THE MEDICAL OFFICER.

"It is no part of my subject to-day to deal with this question, as it refers to public sewers, but I do wish to take this opportunity of entering my protest against some of the systems which are officially being carried out, and notably that which, instead of preventing the formation of noxious gases, tends to bottle them up and discharge them some few feet above the roofs of private houses. I have on a previous occasion shown instances where, I believe, a system similar to this has been productive of suffering and death, and I may say that, acting on my advice in a neighboring town, for which I act as medical officer of health, all ventilators of sewers up private houses have been removed by the corporation.

"It is to be regretted that in considering a question of this kind the matter should be treated as one belonging only to the department of the surveyor. In matters sanitary, as in other professional matters, no doubt there is a tendency at the present time to specialize unduly, but while it is the duty of the sanitary engineer to formulate and carry out a system for the removal of sewage and waste waters, it is no reason why the medical side of the question should be forgotten, and I maintain that this can only be definitely and properly settled by the harmonious working of medical and engineering experts. In this matter of ventilation of sewers it is no doubt comparatively easy to abate the nuisance as far as the nose is concerned, but I think in the past we have been too ready to forget the real meaning of the proverb that the remedy may be worse than the disease."

Joseph Priestley, B. A., M. D., D. P. H., read a paper on

COMBINED DRAINAGE: ITS PROS AND CONS.

He said: "There has recently been such difficulty in connection with combined drains, which are 'sewers' in the present state of the law, and for which the sanitary authority is liable as to repairing or relaying, owing to the combinations not having received at the time of construction the formal approval, sanction, order, or direction of the sanitary authority concerned, that there is a tendency to-day to askance at and refuse all plans of drainage showing a combined system. Of recent years, too, sanitary au-

thorities have had to expend thousands and thousands of pounds upon combined drains, so that they felt justified in insisting upon a separate drain to each house or building. Such an extreme view is unwarranted, as all sanitarians are agreed that a first principle in drainage is to keep the drain as far as possible outside, so that, in the event of defects in connection with the drains, no harm shall result to the occupiers by the escape of sewer or drain gas—a condition of things which may and does arise even in these days of expert drain laying, farm settlements, etc. Detached and semi-detached houses can have a separate drain to each house, the drains being kept easily outside. In the case of a row or terrace of houses, a back line of drainage can be provided, discharging into a branch sewer in a side roadway, or be turned into the sewer in the roadway in front, either through an open uncovered passage-way between two adjacent houses (and not less than 5 feet for the width of such passage-way), or by the side of one house, or even, where necessary, through and under one of the houses. By branching each house separately into this back line of drainage all drains are kept outside, or, at the most, one house only has a drain running under and through it; whereas, if a separate drain and a separate connection into the main sewer is insisted upon, each house has to have a drain underneath and through it. How many houses ought to be allowed in a combined drain? In practice I would restrict the number to six (or less), and have the combined drain intercepted and ventilated separately; but with more than six houses, the main drain might be regarded as a 'sewer,' and treated accordingly—each house drain being separately intercepted therefrom and ventilated. In the exceptional cases, where the combined drain has to pass under a house, great care must be taken in laying the same, *e. g.*, manhole back and front, joints absolutely air-water-tight, drain (if not iron) embedded in concrete, intercepted trap provided, etc. As to the law: in the metropolis, with which I am concerned officially, the recent case of Appleyard v. the Lambeth Vestry has laid down the law very simply. Section 74 of the Metropolis Local Management Act, 1855, allows a combined system which has, previous to laying, received the formal order of the Vestry or District Board concerned; while section 17 of the Metropolis Local Management Amendment Act of 1862 extends the powers of the previous Act beyond the Vestries and District Boards (which were created in 1855) to Metropolitan Commissioners of Sewers, who came into

existence in 1848. Prior to that date, all combined drains constructed are, in London, 'sewers,' repairable by the sanitary authorities—a very large order. The new public Health (London) Act, 1891, gives no definition of drain. In districts served by the Public Health Act, 1875, a combined drain receiving the drainage of two or more houses is a 'sewer,' repairable by the sanitary authority, but the Public Health Acts Amendment Act, 1890 (Section 19 of Part I.) gives the sanitary authority power to deal with a combined system, and to recover the expenses incurred in dealing with such combination under Section 41 of the 1875 Act. The 1890 Act is permissive. Conclusions: (1) Where a scheme of drainage is simplified, and the drains kept outside, by means of a combined system (or even in the rare case when the combined drain has to be taken through and under one house), it ought to be allowed, in stead of insisting upon a separate drain and passing through and under each house—such a combined system being best hygienically, financially, or otherwise. (2) When six (or less) houses are combined, the combined drain is to be intercepted and ventilated separately as a whole, but where more than six houses join, the main drain had better be treated as a 'sewer,' and each house separately intercepted therefrom and ventilated—the main drain itself not being intercepted, except in the rare instance where such drain passes through and under a house or building."

The president, in opening the discussion, said it was gratifying to him to find that those who were taking note of sanitary matters, especially drainage, were aware of the evils of the multiplication of traps. He always condemned the "Model" by-laws of the Local Government Board, which were far from model, and he hoped that the Board would discard them, and substitute new and reasonable ones for them.

Following the discussion a paper by Dr. Chas. Porter was read.

"THE QUANTITY OF WATER REQUIRED FOR DOMESTIC FLUSHING PURPOSES."

"The water-carriage system of refuse disposal," he said, "which is yearly becoming increasingly prevalent throughout the country, aims at the cleanly and rapid removal, through drains, of excremental matter from the neighborhood of dwellings. For its successful application and working adequate flushing of water-closets and house drains is absolutely essential, in order to prevent the

latter from becoming 'nothing better than elongated cesspools charged with foul festering filth,' as was shown to be the case at Maidstone. The recent Government report on the typhoid epidemic in that town tells us that half of its 6,000 odd houses have water-closets without any mechanical means of flushing, and that the sanitary authority's lamentable 'failure of duty in this respect has led to the gravest consequences,' a large number of typhoid cases being officially ascribed to soil and air-pollution from blocked and defective drains. In advocating conversion to water-carriage we ought therefore to satisfy ourselves that the public health is protected from the results of such deficiencies, and with this object in view I was directed in April last by the Corporation of Stockport to ascertain experimentally the quantity of water required to efficiently flush a water-closet with drain and intercepting trap. Upward of 120 experiments were shortly afterward carried out on the lines adopted by the Sanitary Institute in 1893."

The more important of these are given in this, which, for lack of space, we omit. From these Dr. Parker deduces the following conclusions:

1. That 3 gallons is the minimum amount that can be relied upon for efficient flushing, *i. e.*, prompt carriage of dejecta through closet, drain and interceptor to sewer, even with a good form of wash-down closet, well laid 4-inch or 6-inch drain and good 4-inch interceptor.

2. That if an inferior type of closet be used or if the intercepting trap exceed 4 inches diameter, 3 gallons is clearly not sufficient for effective flushing. The proper remedy then, however, is to correct such structural deficiencies rather than to increase the flush.

3. That if no intercepting trap be employed a flush of 3½ gallons is the minimum amount that can be relied upon to efficiently cleanse the closet trap and drain.

4. That the invariable employment of a disconnecting trap, as recommended by the Model by-laws, is far from being an unmixed benefit, and owing to the obstacle the disconnecting trap presents to the cleansing of house drains, its use should be strictly limited to those dwellings inside which a drain opening exists, *e. g.*, in the cellar, and if such drain openings inside houses were prohibited in new dwellings disconnecting traps might, with great advantage, be entirely dispensed with.

There is much reason to believe that we have hitherto exagger-

ated the potency of sewer air; assuming, however, that it is noxious in its effects, the object of a disconnecting trap is wholly gone if we keep all drain openings outside our dwellings, and, having done this, it is absurd to continue to insist on disconnecting traps which only diminish the efficiency of the flush of water.

Among other papers of interest presented at this congress were: "Economy of Water Effected by the Use of Waste Water Closets;" "Sewage Disposal in Connection with Tidal Estuaries," by H. Bertrom Nichols. Mr. G. H. Smith read a paper on "Some Sanitary Defects in Rural Districts."

In the course of this paper Mr. Smith made suggestions for the remedy of the defects. He placed the difficulty of obtaining a pure water supply first. The supply, being drawn chiefly from wells and watercourses, was liable to serious pollution. It was nothing uncommon to find the well and the cesspool in close proximity, and the well consequently suffered. Rivers and watercourses were other sources of water supply in country districts which were liable to easy pollution—for instance, farmers turned streams into washing places for sheep. As a remedy for this state of things he advocated an increase of the powers of rural authorities. Another sanitary defect which he dealt with was the condition of many village cottages. The unsanitary state of such houses arising from bad buildings and insufficient repairs was added to by sanitary conveniences of the most primitive type. Under such conditions existed many of the agricultural laborers of the country, and one wondered that they were not more subject to disease and early death. It was only their outdoor life which saved them from this. The most practical remedy was to grant power to the parish and rural councils to obtain land and build cottages wherever it was considered necessary, and the money to do this should be raised on the security of the local rates. In conclusion, he contended that all inspectors of nuisances should hold certificates granted by that institute, and, in addition, they should not be allowed to hold any other office.

In the discussion following this paper the president said that matters of water supply for country places were dealt with in too small a manner. If it were compulsory for large cities drawing their water supply from a distance to make provision for the supply of water to villages on the way, the difficulty as to the water of those villages would be largely removed. No doubt there were districts where wooden houses might be erected, but they should always be looked upon as of a temporary character.

"The Purchase of the Catchment Areas as a means of Protecting the Sources of a Public Water Supply" was a subject introduced by Dr. J. Spottiswoode Cameron (Medical Officer of Leeds). Dr. Cameron pointed out the different ways in which public water supplies might be polluted, and urged that not only should authorities have power to acquire land for water storage, but they should have similar power with regard to the gathering grounds.

A paper was read by Mr. James Mansergh Modust, C. E., on the "Birmingham Water Scheme."

The concluding paper, on "Plenum Ventilation," by Dr. S. Barwise (Derbyshire), described the system of ventilating buildings by admitting fresh air toward the ceiling of rooms and extracting the foul air by means of outlets near to the flooring—a system which has been adopted at the Birmingham Technical School and the new German Hospital.

The president then announced that the next congress would be held at Southampton on August 30, 1899.

Votes of thanks were passed to the Lord Mayor and Lady Mayoress, the Corporation, the Councils of Mason University College and the Midland Institute, to those who had shown hospitality to the local committee and secretaries, the press and the president, and the meeting ended.

SOME CONDITIONS OF VILLAGE LIFE IN ENGLAND.

A *Press* representative, who has been inquiring into a serious outbreak of typhoid which has broken out in Garlinge, a village contiguous to Margate and Westgate-on-Sea, and only three miles from Ramsgate, has obtained some rather startling information. The enteric fever, he learns, has extended into some neighboring villages, where investigation has revealed a condition of things which, at the close of the nineteenth century, is simply astounding. Garlinge is stated to contain some 300 inhabitants, who for the greater part are composed of the laboring classes and mainly work in Ramsgate and Margate.

A gentleman living near the infected village described to the *Press* representative the sanitary, or rather unsanitary, arrange-

ments of the place. The village, he said, was absolutely undrained. All slopwater, etc., was thrown down a sink, which drained into a cesspool. These cesspools were emptied every ten or twelve years, when they got full. He estimated that it would cost £8,000 or £10,000 to drain the place, and the people were too poor to pay it. An addition of 1d. in the £1, he said, would not produce more than £5 per annum. In conclusion, he said: "Do not mention my name, or they would set fire to my house." Subsequently the pressman visited several of the fever-stricken cottages in Crow Hill. In one of these lay a patient who could not be moved because the hospital was full. There was only one small room downstairs, 6 feet 6 inches in height, and a pantry and two bedrooms. There were no means of ventilation except through the door, and although the place was very clean and tidy, the odor was not agreeable. The slops and foul water had to go down a "sink" close to the door in the back yard, which flows into a cesspool common to three cottages.

The gravity of the situation has become more acute in consequence of the hospital being full, as there are no other means of isolation. Up to the 9th inst. there had been fifteen cases of typhoid fever and three deaths, and two fresh cases were reported on Sunday. The district council are adopting active measures to check the progress of the disease. Under the advice of the medical officer disinfectants are being liberally distributed, and an extra staff of men has been engaged to remove the dry ash-pails with regularity every morning. The council have decided to build a new infectious disease hospital, at a cost of £30,000, on a site near the present hospital, which is insufficient to meet the requirements of the times.

The question of sewering Westgate-on-Sea has been the subject of discussion for several years, and now the council have bowed to the pressure brought to bear by the rate-payers, and a scheme of drainage will be carried out at a cost of £15,000. The work will be commenced early next month and will be completed by the end of March. The council are also going to drain Birchington. There seems no fault to be found with the water supply. Dr. Robinson has prepared a report on the outbreak, which will be submitted to an early meeting of the district council, and then forwarded to the Local Government Board, who will, no doubt, send down one of the medical inspectors to confer with the local authorities as to the best means of checking the epidemic.

SAVING THE CHILDREN.*

By Samuel W. Abbott, M. D., Secretary of the State Board of Health.

Speaking of the service of official health bodies, he said:

"The most important work of local boards of health, beyond question, is the management and control of infectious and preventable diseases or causes of death. In those municipalities where this branch of sanitary work has been efficiently and thoroughly carried out, the sanitary authorities have had the satisfaction of witnessing a very decided fall in the death rate from infectious diseases, and a consequent saving of human life, a saving which is worthy of commendation as much as is the heroic act of the life-saving crew which breasts the storm and rescues a shipwrecked and dying company from some unfortunate craft upon our storm-beaten New England coast. 'Tis true that the life-saving crew have imperilled their own lives, but the grand result is the same in either case, the humanitarian result of saving human life.

"That this saving of human life has actually resulted, and that too in a very large degree as a consequence of the well directed efforts of sanitary authorities, cannot admit of a reasonable doubt.

"But, while these evidences of the great advantage of sanitary measures are clearly demonstrated, it still remains a fact that the general mortality of the State has not materially changed in a period of forty years or more, since, while the death-rate from certain diseases has diminished, that of others has increased in a corresponding degree. How, then, may the balance of mortality be so influenced that there may be a decided fall in the general death rate (as has actually happened in England).

"I have carefully examined the list of diseases in which an increased death rate has occurred in Massachusetts, and have no hesitation in stating that boards of health in our large cities will find a fruitful field of work in the study of the question of infant

*Abstract of a paper read at the quarterly meeting of the Massachusetts Association of Boards of Health, at Lawrence, Oct. 27, 1898.

mortality, its causes and the prevention of its excessive prevalence.

"Another reason for encouragement in this special direction is the fact that many lives saved in infancy are saved for a long and useful life, and are, in fact, so much added wealth to the community at large. Dr. Schlossmann says: 'The death of every child constitutes a definite loss of national wealth.' On the other hand, energy expended in saving the lives of the aged from the inroads of disease at the later years of life only saves this class at a period when they are most likely to be a burden to the community."

Dr. Abbott spoke in detail on the prevalence of infant mortality in this State, its causes and conditions and methods of prevention. Our statistics of infant mortality are seriously defective.

Statistics for the forty years from 1856 to 1895, inclusive, show that the death rate of children under one year of age per one thousand births has varied from 202.7 in 1872 to 119.2 in 1857 and 1858 each. The average for the first twenty years was 150.3, and for the second twenty was 161.2, and the average for the forty years was 156.3. The infantile mortality of the cities of the State, from 1881 to 1890, inclusive, varied from 239.7 in Fall River to 111.9 in Newton. The figures for Boston were 188.2. Lowell and Lawrence only were above Boston, with Fall River, the former being 222.5 and the latter 213.9. In the cities the average infant mortality for this period was 174.9, whereas for the rural portions it was only 129.5. Figures were given of foreign countries, showing that from 1884 to 1888 in Ireland the rate was only 94 per 1,000 births. This was the lowest figure, and the rate increased in different countries till it reached 287 in Bavaria from 1879 to 1888. In England it was 144 from 1885 to 1891. In France it was 165 from 1885 to 1890. In Massachusetts, from 1892 to 1896, of the 54,867 deaths under one year, 11,708 were due to cholera infantum, and the nearest cause to that was atrophy and general debility, which carried off 5,493.

The deaths from diphtheria, whooping-cough, cholera infantum and other diarrhœal diseases, and violence, are more or less preventable, and, in a measure, those from tubercular causes may be reckoned in the same category. These together constituted 45 per cent. of the whole number of deaths of infants under two years of age.

In the case of diphtheria, thanks to the efficient co-operation of local boards of health with the State board in the matter of anti-toxin distribution and gratuitous culture work, the death rate is already diminishing. Speaking of preventable causes and conditions, Dr. Abbott said in regard to density of population, that the aggregation of inhabitants in cities and large towns (other things being equal) coincides with an increase in the general death rate of those communities, but when we analyze the factors of this general death rate, the principal increase appears in the mortality among infants. This principle involving the effect of density of population upon the death rate was established a half century ago by Dr. Farr, who showed that within certain limits there was a definite relation between density and mortality. He showed, moreover, so far as age periods are concerned, that children under five years of age are the greatest sufferers from this condition. But, in Massachusetts, notwithstanding an increase in the density of population from 136 per square mile in 1855 to 300 per square mile in 1895, the general death rate remained practically stationary (about 19.5 per 1,000), "a fact that may be taken to show that improved sanitary conditions have nearly counterbalanced the unfavorable influence of increasing density."

It is hardly necessary to assert that intemperance is a direct cause of infant mortality. The records of every country and every city give ample proof of the assertion. The poverty, the neglect, the cruelty, which are the inevitable result of a system of licensed saloons, are all handmaids of intemperance. Cities in which intoxicating liquors are sold freely under local option laws have a higher infant mortality than those in which license is forbidden by the popular vote. In the census year 1895 the infant mortality in the seventeen cities in which licenses were granted was 174 per 1,000 births. In those cities where no licenses were permitted the infant mortality was only 112 per 1,000, or but little more than two-thirds as great. In this estimate no account is taken of those few cities in which the sentiment was divided, so that a change from license to no-license, or vice versa, took place during the year in question. The records of the societies established for the prevention of cruelty to children confirm the foregoing statements both in this country and in England.

In conclusion, then, said Dr. Abbott, while very marked improvement has taken place in this State, in most directions as a result of direct sanitary work on the part of the health authorities

of cities and towns, very little progress appears to have been made in limiting the death rate of infants. That an open door in this direction presents itself to boards of health for earnest sanitary work, an opening, too, which presents an encouraging outlook, I have not the least doubt. Beyond all question the one factor in diminishing the infantile death rate lies in the direction of the food supply of this helpless class. Further improvement of the milk supply of our cities is still needed, the co-operation of women's sanitary associations, whose organization should be encouraged, the intimate control of boards of health of the methods of feeding among the laboring classes, the establishement of day nurseries of creches in manufacturing cities under careful sanitary control, and the circulation of literature generally aimed at improvement in this line of sanitary work.

NEW METHOD OF PRESERVING MEAT.

A new method of preserving freshly killed meats has been discovered by the Danish zoologist, August Fjelstrup, already well known through his method of condensing milk without the use of sugar. The system (according to the printed reports) has stood a remarkably hard three months' test at the Odense (Danish) Company's slaughterhouses, in a very satisfactory manner.

The method in itself is extremely simple, and might be of great service for the troops in the tropics (the writer having had considerable experience in trying to keep meat fresh in Cuba).

The animal to be used is first shot or stunned by a shot from a revolver (loaded with small slugs) in the forehead, in such a way as not to injure the brain proper. As the animal drops senseless, an assistant cuts down over the heart, opens a ventricle, and allows all the blood to flow out, the theory of this being that the decomposing of the blood is almost entirely responsible for the quick putrefaction of fresh meats. Immediately thereafter a briny solution (made of coarse or fine salt, more or less strong, according to length of time meat is to be kept) is injected by means of a powerful syringe through the other ventricle into the veins of the body.

The whole process takes only a few minutes, and the beef is ready for use and can be cut up at once. This method has been examined and very favorably reported on by the general councils at Odense and Aarhaus, and also by many experts.

OLIVER J. D. HUGHES, Consul.

WHERE OUR DAUGHTERS GROW VIGOROUS.

THE DURANT GYMNASIUM.

The difference between this system and that in use in European gymnasia or in the German public schools is interesting because it so well illustrates the differences of American and European social evolution. In Europe the individual per se is of small account. People are thought of in masses—as belonging to this or the other class of life, and they are treated according to rule. So thoroughly rooted is this idea that it makes itself felt as well in all branches of education as in social customs. Some doctor of anatomy and physiology poring over his books evolves a theory in regard to a certain exercise; he has watched its effects, perhaps, and known it to cure dyspepsia or to relieve over-much adipose tissue. Well, then, it is a good thing. Use it for the entire classes throughout the school, for fat and lean, for dyspeptics and those with hearty digestion; what is good for one must be good for all.

But, coming to the American system as taught by the Young Women's Christian Association shows us something different. Develop the individual to his best possibility, and the community is the better for it, exclaims the American. Therefore, no sooner does a pupil enroll herself here than she is sent to the measuring room, and there, through Dr. Sargent's system of measurement, any over or under development is discovered. Incipient curvature of the spine and similar conditions which have escaped the attention of the family physician are often detected by this means. Then, in the office of the medical director, herself a woman, the new pupil is carefully tested as to the condition of heart and lungs and general health, and finally is given a prescription of exercises based upon all these data and thus adapted to her especial needs. When she enters her class, therefore, she is not only prepared to spend her time to the best advantage, but she has begun to realize something about the possible influence of exercise upon the health.

All this care is necessary, too, as a preventive measure, for, say the directors, "to allow indiscriminate exercise would be like turning a child loose in a shopful of drugs."

Talks on the principles of hygiene are given occasionally by the teachers, all of whom are women; medical gymnastics are also available for invalids who come for special treatment. The gymnasium, like the employment bureau, brings the association into touch with women in many walks of life. To the evening classes come those who have been busy all day in store or office; in the afternoon teachers, students, nurses; and in the morning, so-called women of leisure (often more in danger of nervous exhaustion, by the way, than their busier (?) sisters) take their turn. Saturday forenoon there is a class of children, at present twenty-five in number.

The American woman of to-day, so say the statisticians, is larger of statue than twenty years ago. Everybody knows that she is more robust. Out-of-door sports, and especially gymnastics, not of the "heavy" variety, but designed like these, to promote vigor and grace of movement, may have had something to do with this happy result. And the increasing interest being shown in them seems to augur a day when the invalid from having ceased to be "fashionable" shall become unknown.—Boston "Transcript."

HEALTH is the soul that animates all enjoyments of life, which fade, and are tasteless, if not dead, without it: a man starves at the best and the greatest Tables, makes faces at the noblest and most delicate WINES, is old and impotent in seraglios of the most sparkling beauties, poor and wretched in the midst of the greatest treasures and fortunes; with common diseases Strength grows decrepit; Youth loses all vigor, and Beauty all charms; Music grows harsh, and Conversation disagreeable; Palaces are prisons, or of equal confinement; Riches are useless, Honor and Attendance are cumbersome, and crowns themselves are a burden: but if Diseases are painful and violent, they equal all conditions of life, make no difference between a Prince and a Beggar; and a fit of the stone or the colic puts a King to the rack, and makes him as miserable as he can do the meanest, the worst, and the most criminal of his subjects.—*Sir W. Temple.*

DECADENCE OF THE NEGRO POPULATION IN THE UNITED STATES.

A recent inquiry (Brooklyn "Eagle," Nov. 9) of Mr. Henry Gannett, now connected with the United States Geological Survey, and who had charge of the collection of negro statistics for the last two censuses, elicited the following statement: "The last time I estimated the population of the United States, as divided by race, which was four years ago, I placed the whites at 61,000,000 and the negroes at 8,000,000. Of course there have been increases on both sides since that time, but not enough to affect the value of those figures for purposes of comparison. With the exception of certain localities where the colored folk have increased with more rapidity than the whites during a limited period of time, the negroes have failed to hold their own in numerical progress. The first authentic data we have regarding the number and distribution of the negroes of the United States is furnished by the census statistics of 1790, which showed that there were 3,172,000 whites and 757,500 negroes in this country, the whites forming 80.73 per cent. and the negroes 19.27 per cent. of the total population. Although the colored race has steadily increased in numbers since that time, it has not kept pace with the percentage of progress made by the whites. The census of 1850 gave the whites as 19,553,000, or 84.3 per cent. of the total population, and the negroes at 3,638,000, or 15.69 per cent. of the whole people of the country. This showed a decline in percentage of about four for the blacks and a corresponding increase on the part of the whites. The last census gave the figures as follows: Whites, 54,983,000, or 87.8 per cent.; negroes, 7,470,000, or 11.93 per cent. of the total population. From this it appears that the whites have increased in a century from a little over 3,000,000 to nearly 55,000,000, and the negroes from three-fourths of a million to about 7,500,000. The whites were in 1890 nearly eighteen times as numerous as in 1790, the negroes nearly ten times as numerous. In 1790 the latter race formed 19.27, or very nearly one-fifth of the whole population, and at the end of this century they constituted only 11.93 per cent., or less than one-eighth of the population. The following table shows the rate of increase of the negroes and whites during each of the ten-year periods for the last century:

Decade.	Percentage of increase. White.	Negro.
1790 to 1800	35.76	32.33
1800 to 1810	36.12	37.50
1810 to 1820	34.12	28.59
1820 to 1830	34.03	31.44
1830 to 1840	34.70	23.40
1840 to 1850	37.74	26.63
1850 to 1860	37.69	22.07
1860 to 1870	24.76	9.86
1870 to 1880	29.22	34.85
1880 to 1890	26.68	13.51

"This table indicates that with the exception of the two ten year periods, namely, those from 1800 to 1810 and 1870 to 1880, the negro element has in every case increased at a less rapid rate than the white element, and in many cases its rate of increase has been very much smaller. Thus a comparison of the numerical progress of the negroes with that of the whites in the country as a whole shows that the former have not held their own, but have constantly fallen behind; they have not increased as rapidly as the whites.

"It may be said that this is due to the enormous immigration which certain parts of the country have received, an immigration composed entirely of whites. This suggestion can easily be tested. White immigration on a considerable scale began about 1847. Prior to that time it was not of importance. We may then divide the century into two equal half centuries. Between 1790 and 1840 the whites increased 4.5 times, the negroes but 3.8 times. The latter element has diminished in relative importance in this half century from about one-fifth of the population to one-sixth. In the succeeding fifty years the whites had increased 3.9 times, and the colored 2.6 times only. These figures and the conclusions necessarily derived from them should set at rest forever fear regarding any possible conflict between the two races, other than local disturbance. We have here the testimony of the century to show that the negroes, while in no danger of extinction, while increasing at a rate probably more rapid than in any other part of the earth, yet are increasing less rapidly than the white people of the country. It is very clear that as the years pass on the latter will become more and more numerically the dominant race of America."

The mortality figures for two races may have something to do with this disparity in the rates of increase. "There is no question," says Mr. Gannett, "but that the rate of mortality among the negro population is considerably greater than among the whites. It is not easy, however, to obtain accurate measurement of the relative death rates, owing to the fact that the census statistics on this subject are incomplete. It is only in a few large Southern cities which maintain a registration of deaths that reliable figures are to be had. The death rate per 1,000 in the following cities is given: St. Louis, whites 17, negroes 35; Baltimore, whites 22, negroes 36; New Orleans, whites 22, negroes 37; Washington, whites 19, negroes 38; Louisville, whites 18, negroes 32. From these figures it appears that in the large cities the annual death rate of the negroes is very nearly if not quite double that of the native whites. It is probable that in the rural districts the disproportion among the death rates is not as great, since it is found that a rural environment is better suited to the negroes than the surroundings of a large city."

In addition to making a study of the relative increase of the two races, Mr. Gannett has looked up the distribution of the negro element with some interesting results. "While they are found in every State and Territory in the country," he says, "the vast body of them are found in the Southern States lying south of Mason and Dixon's line. In three States, Louisiana, Mississippi and South Carolina, more than half the people are negroes. Indeed, in South Carolina three out of every five of the inhabitants are of this race. In all the States along the Atlantic and Gulf coast, from Virginia to Louisiana, together with Arkansas, more than one-fourth of the people are negroes, while, on the other hand, throughout the entire North and West, the proportion of negroes is less than 5 per cent., and in many States it is less than 1 per cent. of the total population. It is a curious fact that more than 17 per cent. of the negoes live in the low, swampy regions of the Atlantic coast, and in the alluvial region in the Mississippi Valley. This proportion contrasts sharply with that of the total population, of which only 4 per cent. are found in those regions. Upon the Atlantic plain the proportion of negroes is also much greater than that of the total population, and, generally speaking, it may be said that they seek low, moist localities and avoid mountainous country. This peculiarity of their distribution is brought out more forcibly in their distribution with reference to elevation above sea level. At

an altitude of less than 100 feet above the sea there are found nearly one-fourth of the negroes, while only about one-sixth of the total population is in these regions. Below 500 feet are found seven tenths, while nearly two-fifths of the total population are found in this altitude. Again, below 1,000 feet there are found 94.5 per cent. of all the negroes of the country, while of the total population there are found only 77 per cent. below that altitude. It is, of course, well known that the negroes prefer higher temperatures than the white race. While the total population lives on an average under a mean annual temperature of 53 degrees, that under which the negroes live is on an average 61 degrees, or 8 degrees higher. The great body of negroes live where the mean annual temperature ranges from 55 degrees to 70 degrees, very nearly 85 per cent. of this element being found within the region thus defined."

THE BEST SOLUTION OF THE RACE PROBLEM.

The race difficulties in the South and in Illinois continue to be discussed in the newspapers, but there are signs of a gradual loss of public interest in the question, which is so characteristic of the American people, and upon which Mr. McKinley is said to have relied as the best defence that Mr. Alger had. The negroes of New York have held a mass-meeting, and this meeting has been followed by others in different parts of the country. The negroes, at all events, are not losing interest in the matter, because their welfare, and even their lives, depend upon a proper settlement of the question. Notwithstanding the fact that the government owes it to itself and to its citizens to enforce the law, we do not see how the question can be finally settled without the aid of the negroes themselves; and upon this point Mr. Booker T. Washington and Mr. John C. Darcy have given their race excellent advice. It is, in effect, that they refrain from pushing forward into politics, and from demanding public positions—in other words, from doing those things which alone seem to arouse the enmity of the whites, who are determined that this shall be a "white man's government." The negroes, by refusing to become spoils politicians, will not be guilty of an act of cowardice, but will be doing an act of tactfulness, which is demanded of them in view of the great blessing which the whites have given them—that is, the blessing of freedom.—"Harper's Weekly."

THE LEPERS OF MOLOKAI.

THE REV. DR. E. G. WHEELER, who recently returned to his home in Los Angeles, Cal., after a residence of several years in the island of Maui, in the Hawaiian or Sandwich group, has had an unusual opportunity to learn much about the lepers and their horrible disease in the Hawaiian islands. He has been employed as a missionary among the natives in the remote localities in the backwoods islands of the Hawaiian group. Several months ago Dr. Wheeler, after some diplomacy and influence, got permission from the Government Board of Health of Honolulu to go and spend a day or two in the leper settlement at Molokai. His purpose was to examine into the care that was given to the unhappy people who have been banished to Molokai, and who must remain there until death removes them from their loathsome disease and their isolation. Dr. Wheeler went, accompanied by a physician connected with the Board of Health at Honolulu, and he was instructed to obey the physician constantly concerning where he might go and his contact with the lepers in the settlement.

"The part of Molokai occupied by the lepers," Dr. Wheeler reports (Minneapolis "Tribune," Oct. 2), "is about three miles long and about three-quarters of a mile wide, containing about 15,000 acres. The Pacific ocean beats upon the shore of three sides and a huge precipitous range of cliffs cuts off the view on the fourth side, and makes escape from there an utter impossibility. The climate is always soft and balmy. Bananas and oranges grow there wild. The island is better managed under the Dole administration in the Hawaiian republic than when the monarchy was in power. The sanitary conditions have been bettered and better homes and food are provided for the wretched people who have been sent there never to leave the island, and seldom see their friends and relatives. The Roman Catholic church has done more than any other denomination in the way of alleviating the sad lot of the 1,240 residents of the leper colony. The sacrifice that the late Father Damien, who went to Molokai in 1874, when he was a young, healthy, finely-educated priest, to make his home among the lepers and to die there, as there was no alternative, is well

known. The good that Father Damien did in Molokai is hardly expressible. Even in the midst of pain and helplessness at the literal rotting away of his hands and nose and eyes, he went about daily visiting the diseased and dying, and cheering the young men who were torn from homes in Honolulu and other Hawaiian towns to spend their remaining years at Molokai. There are in the leper colony now two Roman Catholic priests who have cheerfully given up their lives to pain and disease and comparative imprisonment. Because they were inspired by Father Damien's example. Besides, there are six Catholic sisters from New York and Pennsylvania, who went to the island last winter, to live there until released by death from horrible leprosy, because they see it their mission to minister to the girls and women at Molokai. The Methodists have built a little wooden church in the colony in the past two years, and there is service there every Wednesday and Sunday by a clergyman. He lives alone on a remote part of the island, and goes to the colony to preach and pray. He is a very charitable man, and draws no pay for his services. Besides he sends quantities of food and clothing to the lepers every holiday season. I believe he came from Syracuse, N. Y., where he inherited a small fortune. He believes that by extreme and ceaseless care he will keep from becoming infected with leprosy, and that he may thus be able to minister to his diseased flock longer and better than the Catholic missionaries do, who resign themselves to fate among the lepers.

"The native Hawaiians comprise over 90 per cent. of the lepers at Molokai. I saw a dozen men of American birth among the diseased residents on the island. They had lived in the Sandwich islands for years and had become lepers from too intimate association with the Hawaiians. There are some Chinese and Japanese there, and a sprinkling of English and Germans. I spent much time in learning about leprosy. The leading physician in Honolulu (a graduate from the College of Physicians and Surgeons, in New York) told me that the disease is no doubt inoculated where there is an abrasion of the skin. The Hawaiians have a dish of half-baked raw fish and roots—known as poi—and from one large vessel of this a whole family and all the family friends always eat at one time. A leper may be among the eaters, and even he may not know the insidious disease is in his blood. He dips his hand into the food, and it is very easy to see how another may thus contract leprosy. Pipes used by several per-

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sons is another way that the awful disease is spread. Then, too, the native Hawaiians live in filth and have no idea of hygiene and pure air. Leprosy seems to defy all rules both in appearance and development, and there are many people who are sure they never had the disease when they were put under arrest as suspected lepers and sent to the island to live a living death, where they say they soon contracted leprosy. The disease first manifests itself by discoloration—white spots the size of a 25-cent piece usually on the lower limbs and back. Several lepers at Molokai told me that they first knew they were doomed when they found that things heated so hot that a person would naturally drop them in a second were only pleasantly warm to them. The nerves of the fingers are soonest affected, then the other parts of the body. The first evidences of waste—and it is at this stage that the officers employed by the Board of Health of Hawaii find almost all of the hopeless victims they arrest and transport to Molokai—are at the finger joints and toes.

"While I was at Molokai I spoke in the afternoon from the pulpit in the little Methodist church. The physician who accompanied me told me that I should not shake hands with any one there, and to keep in the fresh air all the time. The seats in the church are rude benches, a few of which have backs to them where the more diseased lepers may sit. The open door and windows looked out upon the black soil and volcanic rocks that compose the island, and I could hear the ocean roar, as it beat upon the rocky shore about us. There were about 200 people in the congregation that assembled to hear me. I think every American-born man on the island was there, and one or two Englishmen, and the rest were Hawaiians, about equally divided as to sex. There were several men and women not over 25 years old there, and I pitifully observed a few boys under 15 among the lepers. Probably no stranger assemblage ever gathered to hear the gospel preached. Fully half the people had no fingers. There were many who had neither hands nor ears, and a few with only stumps at their ankles. Crutches stood projected among the listeners to my sermon by the score. One little Hawaiian (or Kanaka) girl was carried in by two women; she had only stumps at her wrists and ankles, and there were two boys, brothers, who were almost as far along in leprosy. Every one bore the stamp of the disease. I spoke in English, for that is now a common language all over Hawaii. When I had finished, a middle-aged Kanaka arose in

his seat to pray. When he had closed he said he wanted to thank the American for coming to Molokai to make the life of the lepers more cheerful. He said that he hoped I would tell all the world what a frightful thing leprosy is, and to urge the smart white man to study their big books and try to learn some way to cure the disease. He said that he had been there nine years, and that he hoped and prayed his wife and children in Honolulu would never know what he had suffered because of his doom away from all that he had loved. One or two other persons, both of whom were without fingers, and one of whom had lost both ears, spoke in broken English in the same strain, so that the assemblage fell to weeping, and I closed the meeting as soon as possible.

"After the meeting my friend the physician and I went for a walk about Molokai. Leprosy fairly oozes from the rocks and soil there. We saw the disease in every stage as we walked past the hospital grounds and looked in through the open doors at the hundreds of little whitewashed cabins that the Hawaiian government has had built for the exiled sufferers. It does not seem possible that a person can live there a week without contracting leprosy, but I was told that four of the Sisters of Charity have been there two years and have not yet shown any symptoms of the disease, but they live as carefully and neatly there as they did in America. The lepers live cheaply at home, but they are all an uncleanly class. Some of them have married leper women at Molokai and have begat children. Several old men, with an ear, an eye or a few fingers missing, and bearing some mark of the disease about the lips and neck, were pointed out to us as having been in Molokai 25 years. The oldest leper there is a woman who was brought there in 1862, when a young woman. She has been an opium eater for years, and says it has checked the disease in her.

"The best known man at Molokai since Father Damien died is Charles E. Dutton. His life of self-sacrifice is scarcely known outside of Hawaii. He was once an officer in the United States army, and was born and raised in Columbus, O. He inherited a fortune and traveled about. A dozen years ago he became converted to Christ and resolved to give his life to following as closely as possible his Master's steps. He heard about Molokai and the people sent there to live a living death, and he went to Honolulu, then to Molokai, knowing that he could never leave the island if he once made his home there. The physician who accompanied

me introduced me to Mr. Dutton, who is known by the Kanaka lepers as the 'good white man.' He is a quiet man, tall, unusually well read in the old standard literature, and especially church history. He says he knows he has incipient leprosy, for he feels the characteristic numbness at times in his feet and fingers, and has the fearful headaches that lepers usually have at first, but he prefers not to speak about it. He lives in a little five-room cottage on the outskirts of the leper settlement, and has the place well furnished. He has a quantity of engravings that he picked up in his travels. One room of his home is lined with shelves, and there are enough bottles and cans and boxes of medicine to stock a country drug store. He has dozens of medical works and dictionaries. His whole life is devoted to an amelioration of the lot of the lepers and the teaching them of the blessings of Christianity.

"Since I saw and knew what that man Dutton is doing for the Master's cause, my opinion of about the whole catalogue of the heroes of the world has been very much altered. He sits with the sick and dying; he nurses them, studies their distress and administers medicines for relief. He cheers them and he plans pleasures for them. He says his heart has been most moved by the score of Kanaka boys and girls in Molokai who have been transported to the island, and who vainly believe that some day they may go back to their fathers and mothers and sisters and brothers. He plans games for the little fellows, but they are so badly crippled and disabled by their progressing leprosy that it is hard to find any game in which all may participate. Base ball, foot ball, and such physical sports are out of the question with the unhappy children. Every morning this man Dutton puts on a blue blouse and a pair of overalls and goes down to what he calls his 'workshop,' a small frame house with a veranda, around which are arranged a number of benches and some dishpans filled with warm water. Miserable decrepit lepers come hobbling in until the benches are filled, and standing room is at a premium. Mr. Dutton, with true religious courage and sympathy, bathes the leprotic sores in the pans of water and applies fresh salve and bandages. He cheers this one, gives a flower to another, helps another to an easy chair for a long rest, and does all that he can to make their existence easier to bear. A Cincinnati woman has presented him with a large music box, and while he is attending to these poor people with great ulcers on the soles of their feet,

and without toes, or even without much of any feet at all, this music box plays waltzes by Strauss—a genuine piece of sarcasm.

"I have been asked many times since I was at Molokai as to how much physical pain the lepers suffer. I believe there is comparatively little pain about the disease. Several lepers who had lost parts of their anatomy said that the nerves are first deadened as the disease is contracted, so that the loss of a foot or a hand is not painful. The Hawaiians are a peculiarly happy, juvenile race of people, and what would be an unbearable calamity to Americans is taken with resignation by them. The only cases of suicide at Molokai among all the 5,000 people who have been there, first and last, were of white people. The lepers have all the company they want. They keep moderately busy all the time, and they sing and tell stories by the hour. They have meat, bread, poi, plenty of clothes and bedding, churches, a reading room, and good enough homes. They have organized a band of musicians among them, and some are quite good performers. The Catholics have erected several plain pavilions, like hospital wards, with kitchen and dining room attached. The sisters try to induce the leper girls to occupy these quarters, designed for their comfort, and they are comfortable. But as a usual thing the girls would rather enjoy the perfect freedom of the separate private cottages than to be under the rules and restrictions of the church."

THE SUBSIDENCE OF THE CITY OF SAN FRANCISCO.—According to the newspapers of San Francisco, that city is sinking into the sea. Surveys made by the city authorities are said to have shown that the average rate of subsidence is two inches a year. The engineers explain the phenomenon on the condition of the ground on which the city is built: sand mixed with decayed vegetable matter, extending to a depth of at least sixty feet, and that the compression or escape of this soil, under the heavy load of buildings which have been placed on it, is sufficient to account for the subsidence. Whether the spongy soil simply settles by compression or escapes into the sea remains to be determined.

NUTS AS FOOD IN FOREIGN COUNTRIES.*

FRANCE.

Chestnuts.

The absence of indian corn as an article of diet among the poorer classes in France is, to a certain extent, replaced by the popular chestnut. Throughout the centre of this country, from the Bay of Biscay to Switzerland, there are large plantations, and almost forests, of chestnut trees. These nuts differ very much from the ordinary species indigenous to the United States; they are broad, large, and resemble the American horse-chestnut or buckeye (*Æsculus hippocastanum*), and are extensively eaten by human beings and animals. Great care is taken in harvesting this nut before the severe frosts touch it, as freezing hastens fermentation.

The poor people, during the fall and winter, often make two meals daily from chestnuts. The ordinary way of cooking them is to remove the outside shell, blanch them,† then a wet cloth is placed in an earthen pot, which is almost filled with raw chestnuts; they are covered with a second wet cloth and put on the fire to steam; they are eaten with salt or milk. Hot steamed chestnuts are carried around the city streets in baskets or pails; the majority of the working people, who usually have no fire early in the morning, eat them for their first breakfast, with or without milk. Physicians state that, as an article of food, chestnuts are wholesome, hearty, nutritious, and fattening. These nuts are often used as a vegetable and are exceedingly popular, being found on the table of the well-to-do and wealthy. They are served not only boiled, but roasted, steamed, puréed, and as dressing for poultry and meats.

Chestnuts are made into bread by the mountain peasantry. After the nuts have been blanched, they are dried and ground. From this flour, a sweet, heavy, flat cake is made. It resembles the oaten cakes so popular among Scotch peasants. They are extensively employed for fattening animals, especially hogs. The nuts are boiled without shelling; only small, inferior fruit is thus used.

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* United States Consular Reports.

† This is done by throwing the nuts into boiling water and with a "briguette" rubbing them around the kettle until the inside skin falls off. The briguette is composed of two square pieces of wood, 24 to 30 inches long, the angles of which are notched 1 foot up; they are joined, like shears, with a rivet.

In good seasons, chestnuts sell as low as 1 cent a pound retail, and wholesale at $1.50 per 2 cwts.

When these nuts are stored, they are very apt to heat and ferment. Great care must be taken to prevent this; they are placed in cool, airy bins, so that the air can readily pass through the pile and perfect ventilation be obtained.

Walnuts.

This nut tree is very generally grown all over France, but more especially in the central and eastern departments. Walnuts as an article of food are losing ground in France, because of the scarcity of the product. The trees have been greatly in demand for timber and furniture making; nevertheless, there are certain sections of the country in which these nuts form a regular article of diet.

The peasants eat them with bread that has oftentimes been rubbed with garlic. The hygienic effects are considered good, replacing meat to a large extent.

These nuts are also used to make oil. It is much cheaper and similar in taste to that pressed from olives, and is employed to adulterate the latter. The prisoners, in certain prisons, are engaged in cracking walnuts and picking out the kernels, which are pressed into oil.

The prices vary very much according to the harvests. There is but little difficulty in keeping these nuts after they have been thoroughly dried.

Almonds.

Almonds are largely exported from France. The climate of the middle and southern departments of this Republic are most favorably adapted to the growth of this fruit. In the summer the almond, while the shell and husk are soft, green, and tender, is sold by the dozen or hundred in the markets, at from 1 to 5 cents per dozen, according to the condition of the crop. The meat is white and creamy. As an article of food, they are not used as extensively as chestnuts and walnuts.

Almond oil is employed for various purposes. Apricot stones are often ground with almonds to adulterate the oil. Confectioners and cake bakers consume large quantities of these nuts in making different kinds of cakes and candies.

Hazelnuts.

These nut trees are only grown for their fruit, and, although they will flourish in nearly all the departments, the nuts are considered a luxury and are always high priced. Hazelnuts are

eaten green, like almonds, in the summer, when they are sold at a more reasonable rate. The exportation from France is unimportant.

Peanuts.

This nut, so common in the United States, is very rarely eaten roasted in France, and nearly all that enter the port of Bordeaux are imported from Spain, Italy, and Africa. The variety is small and uninviting looking and exorbitantly high, the price being about three times that asked in America. The taste for these nuts as a food is growing; it is practically certain that if the fine American varieties were put upon this market at a reasonable price, they would find a ready sale.

Many tons of peanuts are imported from the west coast of Africa, India, and Malayan Archipelago and are sold in Marseilles and other European countries; these are principally for the oil, which is extracted from them. Peanut oil is used for cooking purposes and as an adulterant and substitute for olive oil.

Nutritive and Medicinal Qualities of Nuts.

Several physicians, in different parts of Europe, have been making experiments as to the nutritive and medicinal qualities of all kinds of nuts, and have advanced views favoring their use as food under certain conditions for special diseases. Nuts contain a special kind of salt especially adapted for lubricating or softening the muscles of the arteries. Some practitioners claim that elderly people would be benefited by a more extensive nut diet. The only evil to be overcome is that the nut meats should be thoroughly masticated, so that no hard pieces may enter the digestive organs.

WALTER T. GRIFFIN,
Commercial Agent.

LIMOGES, December 15, 1897.

ITALY.

In this consular district, comprising the provinces of Catania, Syracuse, and Caltanissetta, five kinds of nuts are grown, which, although requiring different altitudes and climatic conditions, thrive because the necessary conditions exist—conditions rarely found in any other country of the same limited area. Here are the fertile slopes and foothills of Etna, where such nuts as require a colder climate grow, up to an altitude of from 2,000 to 4,300 feet, and also the rich plains and valleys, where, in a semitropic clime, in full view of Etna's snow-capped peak, one beholds the snowy blossoms of the almond tree.

Almonds.

Almonds rank first in importance. The average annual crop in this district is estimated at about 4,000 to 4,500 tons; that of the entire island, about 7,500 tons per year for the last few years, excepting this year.

While yet green or soft, almonds are eaten by the well-to-do classes as dessert (the poorer cannot afford them). The nuts are placed upon the table with the outside shell on, but cracked (the hard shell has a covering resembling a small, shriveled-up, unripe peach); the skin, which covers the kernel, slips off easily by a slight pressure between the thumb and forefinger. In a dry state, the consumption is much greater; but, as stated, almonds can only be considered a luxury.

Filberts or Hazelnuts.

These come next in order, grown on the lower slopes of Etna and in the provinces of Syracuse and Caltanissetta. The estimated average crop in this district is about 2,200 tons.

Filberts are mostly eaten after they have been roasted in hot ashes. In the roasted state, they are offered for sale on the streets by peasants. They take the place here of peanuts in the United States, except that they are not freshly roasted.

Chestnuts.

There are chestnut plantations on the slopes of Etna from about 2,000 to 4,300 feet altitude. The estimated annual production is from 80 to 100 tons. As these groves have been planted more for the use of the timber than the nuts, the latter are, with few exceptions, inferior in quality and size to the fine, large chestnuts raised in Calabria (southern part of Italy), which are called "maroni." The young trees on Etna (at least for the most part, I am told) are not grafted; they are raised from nuts, and all the suckers or sprouts are permitted to grow up, and when the largest are of sufficient size for use as lumber, they are cut off, timber being scarce and lumber nearly all imported.

Chestnuts are the only nuts that can be said to enter into the regular diet of the people, their consumption during the fall and winter season (beginning with the gathering of the nuts) being considerable. Almonds, filberts, and walnuts are more a luxury, served as dessert or with wine at social gatherings, and are sold in the streets by the fruit venders. As in the United States, they are also used by confectioners, the pistachio nuts being used almost wholly in this manner, excepting those exported.

Chestnuts are mostly eaten roasted. They are placed in a sheet-iron pan with handles on opposite sides, perforated with holes about half an inch in diameter, and put over a slow charcoal fire (in a small furnace) until the shells burst open, when they are done. During the roasting process, the nuts must be frequently shaken to prevent them from burning. They are also much eaten in a cooked state; often prepared like a stew, with gravy. Besides being served at meals, they are, during the season, offered for sale at the fruit stands or on carts, where they are freshly roasted and sold hot, like our peanuts; a little salt added makes them more palatable.

As the fresh chestnuts do not keep for a very long time, where they are grown in large quantities, as in Calabria, they are dried until they are as hard as dried peas, then shelled, after horses have been driven over them to crack the shells. In this dry and hard state they can be shipped anywhere, which is not the case with the green or fresh chestnuts, which, when packed for any time, become heated, undergo a sweating process, and soon spoil. These dried nuts are said to be as good for cooking purposes as the fresh ones. They are also sold on the streets and eaten dike peanuts.

Pistachios.

These are the finest and most valuable of all. Small pistachio plantations are situated near Bronte, among the southwestern foothills of Etna, and in the province of Caltanissetta. The estimated annual production in good seasons is 45 tons, including those in considerable quantities sent to and exported from Messina.

Walnuts.

These are also grown, but there are only a few small groves and scattered trees. The quality of the nuts is good, but the quantity inconsiderable.

Exports of Nuts.

Almonds and filberts are chiefly grown for export. The smallest portion is shipped to the United States from this district, Germany, England, France, and Austria each being much heavier purchasers; besides, considerable quantities are shipped to other Italian ports.

Value of exports from this distrist to the United States during the last four years: 1894, almonds, $22,813.51; filberts, $24,954.58. 1895, almonds, $42,526.82; filberts, $13,659.91. 1896,

almonds, $38,405.51; filberts, $42,931.62. 1897, almonds, $55,590.21; filberts, $26,346.43.

The production of almonds and filberts (the almond crop was short this year) is constantly increasing; it is said to have doubled within the last ten years. There have also been additional plantations of chestnut, pistachio, and walnut trees. This may be partly attributed to the destruction of many vineyards by the phylloxera, as well as to the fact that the growing of nuts has been found profitable.

Nut Trees in the United States.

We have in our vast area the various soils and the different climatic conditions necessary to produce all kinds of nuts. In southern California, southern Texas, southern Louisiana, southern Mississippi, southern Alabama, southern Georgia, and Florida, almonds ought to grow as well in the United States as in Sicily. In nearly all the Northern and Central States filberts and chestnuts, and doubtless in many localities pistachio nuts (which bring such high prices) might be successfully grown. I should think it would be of great interest to our farmers to seriously study this question, and devote some of their time and land to planting groves of such nut-bearing trees or shrubs as their location would justify.

Prices.

Almonds (sweet) shelled, medium quality, $15.50 per sack of 112 pounds. Prices vary according to size, quality, etc.

Filberts, $4.13 per sack of 112 pounds.

Chestnuts, green, $2.40 to $2.70 per 220.46 pounds; dried, $4.44 to $4.63 per 220.46 pounds.

Pistachio nuts are packed in wooden cases containing about 50 kilograms (110.23 pounds). Like almonds, they vary much in size and quality, and are assorted by hand, the choicest selling as high as $1.20 and the second grade for about 97 cents per kilogram (2.2046 pounds).

Of walnuts, probably not more than about 5 tons (for the entire district) enter into the market in quantities for export, the most of them being consumed at home. They are sold by the peasants, on the streets, at retail, seven to ten for about 1 cent; in larger lots they are sold at from 74 to 93 cents per tamolo (a Sicilian measure, equivalent to about 18 to 20 pounds), according to the more or less green state of the nuts.

The chestnuts produced in this district on the slopes of Etna are not fit for export. The trees not having been grafted, the nuts have a harsh taste, are small, and do not sell as readily as those of Calabria. The wholesale price is $1.85 to $2.04 per 220 pounds. Great quantities of the so-called maroni (fine, large nuts, grown in Calabria) are brought here by boats and exported to near-by countries. I have been told that if these maroni were spread out on the warehouse floors and daily shoveled until they become somewhat dried, they could be safely exported to the United States. Prices, as stated, are $2.40 to $2.78 per 220 pounds.

Dealers in Nuts.

The leading firms who handle the various nuts in Catania are:

Almonds and Filberts—Jacob Ritter, Alonzo & Consoli, Teofilo Cardillo.

Chestnuts and Walnuts—Fratelli Mangano, late Matteo & Domenico di Mauro.

Pistachio Nuts—Teofilo Cardillo.

Pine Nuts.

Besides the five kinds of nuts referred to, another is sold on the streets by the fruit venders—the pine nut. As the name indicates, it grows upon a certain species of pine trees. The conical-shaped fruit closely resembles the pineapple. The shell is hard, heavy, and contains considerable resin, which oozes out when the nut is placed upon a coal fire, which is done to cause the cells to open, when the kernels, two in each cell, can be easily taken out. These kernels resemble in form and size, as well as in flavor, the pistachio nut; but, instead of having the greenish color of the latter (which is used by confectioners as harmless coloring matter), the pine-nut kernels, after the thin skin has been removed, are of a creamish whiteness and oily. They take the place here which peanuts have in the United States, and are much used by candy makers. In this consular district they do not grow as plentifully as in the province of Messina. The retail price is 1 cent each.

Cultivation of Almonds.

I take from the Agricoltore Calabro Siculo, of November 15 last, the following:

"The almond must be considered a plant provided by Providence for the southern provinces in general, and for Sicily especially, vegetating well, even in the crevices of the rocks, resisting the drought, requiring little culture, and furnishing a product very remunerative.

minimum), a circle of about 4 feet is marked around the stake and dug out to the depth of 16 inches around the circumference, gradually inclining toward the centre, where the hard ground is reached. About 8 inches apart, within this periphery, eight to ten slips of some 32 inches in length are planted, so as leave about two or three buds above the earth. The hole is now refilled with fine earth, stratified with fermented stable manure. A number of suckers will sprout from some slips; others will yield none.

The proper season for planting is, after the first rainfall, from November to December. The springs for reproduction are derived from the mother bushes. Filberts can be produced from the seeds, but this is never done, because the plant produced from seed not only would require much more time to bear fruit, but would naturally grow wild and afterward would have to be grafted, and therefore the suckers (shoots or sprouts) are preferred.

Cereals—barley, rye, or wheat—are sown in the filbert plantations during the first years; afterward vegetables are cultivated therein.

The first manuring is done (as already stated) when the sprigs are planted; afterward every three years.

The annual cultivation consists of a thorough digging in January, well around the roots, and a second superficial one in July. The purpose of the superficial digging is essentially to clean the soil of the weeds, which when chopped down work into the soil and help to retain the moisture. During this operation, care should be taken not to destroy the cavities.

During the first two years the plant does not bear fruit, but commences the third year. Any blossoms appearing before this time should be removed, otherwise the young bush would suffer. According to the seasons, the roots should be bared and recovered.

The pruning is done when the leaves are falling, and consists of cutting the offshoots, sprigs which are too long, and the old and dried branches; the latter are replaced by young sprouts, and in this manner the plantations can be revived indefinitely; in fact, there are plantations fifty to one hundred years old.

Irrigation takes place from June to August, once a week. Gathering time is from the end of August to the middle of September, according to the season.

The filberts are not subject to serious diseases, but hail storms and cold winds cause the greatest damage.

LOUIS H. BRUHL,

CATANIA, December 4, 1897. Consul.

KOREA.

Having been asked by certain persons in the United States for information as to the use of nuts for food, I have the honor to send a report on the subject.

Nuts are used quite extensively as food in this country. By far the most common food nut is the chestnut, which almost takes the place with Koreans which the potato occupies with us. The chestnut is used raw, boiled, roasted, cooked with meat, made into confections, powdered and mixed with candy, and dried whole, in which latter condition is becomes quite sweet, but is apt to be affected by worms. The chestnut grown in Korea is the large, coarse variety common in Italy. It is raised in large quantities, in spite of the ravages of the borer, and is so common that during the winter venders of boiled or roasted chestnuts are numerous along the streets. Boys roast the nuts in little excavations in the street and sell the hot nuts to the passers-by.

The English walnut is also grown to a large extent, and is used for food as a delicacy, as it is with us, except that it is used much more generally and forms more of a regular article of diet.

The pine nut, or piñon, is also used in very large quantities, being for sale in most of the shops. As a rule, it is used in its raw state or combined with a candy made from rice. It is mixed with other food to impart a delicate flavor, and always forms a part of the summer drink of sweetened water, to which a little wine and this nut are added. The pine nut is very rich in oil, and is supposed to be strengthening, for which reason it, as well as the chestnut, is given to children of weakly condition. It seems to be difficult of digestion, however, and probably does more harm than good when taken in quantities by persons of weak digestive powers.

Peanuts are grown and are very much liked, but the native peanut is so poor and small that it is hardly worth raising. Considerable quantities of good-sized peanuts are imported of late by the Chinese, and are much in demand. No proper method of roasting this nut is at hand, and, as the Koreans use no stoves, cooking their food in kettles over a fireplace so arranged in an outer room that the smoke and heat pass through flues under the stone floors and thus warm the living rooms, this absence of a suitable appliance for roasting or baking prevents the proper preparation of the peanut for food.

The nut next common is one that resembles in appearance our beechnut, having a white shell. It is called "uhn hang," which

is translated in the dictionaries as *Salisburia adiantifolia*, or ginkenut. This is roasted and used for food, and is also used very largely in its raw condition as a remedy for coughs.

HORACE N. ALLEN,
Consul-General.

SEOUL, February 9, 1898.

SYRIA.

There are seven kinds of nuts grown in this country, but each is mainly confined to its special district, viz.: (1) Common filberts, grown at Anatolia and Armenia; (2) chestnuts, in Asia Minor and Armenia; (3) pine nuts, all over the pine regions; (4) Pistachio nuts, northern Syria; (5) Damascus pistachio nuts, southern Syria; (6) walnuts, of the variety known in America as English walnuts; (7) gallnuts, all over the pine regions.

Filberts and chestnuts are grown mostly on the Black Sea shore, somewhat to southward. I regret I cannot give an estimate of the quantity raised there annually. The chief export port is Smyrna, where they have a market value of about 4 piasters (14 cents) per oke ($2\frac{3}{4}$ pounds).

Pistachios grow, as stated, in Syria, the common variety being mainly confined to the Aleppo Vilayet, and the Damascus pistachio to the province of that name. They are shipped to all parts of the country and exported from Alexandretta and Beirut.

The walnut is a common fruit all over the land.

Gallnuts are not used for food, but are exported for use in tanning hides.

The people do not regard nuts as a regular diet, but the orthodox Armenians, during their fasts, mostly in spring, prepare a dish with boiled wheat (boolghoor) and crushed walnuts. Nuts also enter in small quantities into the composition of several native dishes that are in common use. They are also much used by foreigners residing in the country in the form of pilaff (the national dish), in which nuts are mixed with rice, and in a mixture of meat and vegetables with walnuts or pistachios.

The pistachios and Damascus nuts are roasted and salted and hawked about the streets of practically every town of the Empire, and they enter largely into native candies.

Therefore, nuts in this country may be classed generally as a luxury, for use as a dessert, and for consumption by the natives at night, just before going to bed.

During the fasting time referred to, the poorer classes crush the walnuts, and mix them with boolghoor (grain boiled, dried, and

ground to a coarse powder). By this method cooking is not necessary. They also work up the boolghoor by hand, with a very small quantity of water, until the particles adhere and form masses as large as a tennis ball. The centres of these are scooped out and filled with walnuts or pistachios, which are then covered over and the whole placed in boiling water for a few minutes. This produces a sustaining food.

Pistachios are raised in this consular district. They are shipped to the other parts of the country and also exported. The demand is not great, the average export from the port of Alexandretta being only about 130,000 kilograms (286,489 pounds). The kilogram (2.2046 pounds) is worth from 44 to 57 cents gold.

The exportation of gallnuts during the past year amounted to $201,907, of which the greater portion (about $155,000) went to France; $2,700 worth went to the United States.

HORACE LEE WASHINGTON.

ALEXANDRETTA, December 15, 1897. Consul.

INSOMNIA.

BY I. J. HIGGINS, A. M., M. D., New York.

Whilst it is universally conceded that in the treatment of insomnia recourse to drugs should be taken only after all other measures have failed to relieve the condition, if possible to remove the underlying cause, yet the practitioner frequently finds himself compelled to resort to the means at hand to obtain rest for his patient for the time being, though the remedy used may be open to serious objections. Nearly all hypnotics have one or more features that detract from their frequent or continuous administration, whilst the dangers attending the use of narcotics are but too often illustrated in every-day practice. In long-continued insomnia it is often very difficult to prevent the formation of a habit, to avoid gastric disturbances, to achieve the desired result without a progressive increase in dose, or a constant change of drugs. Most hypnotics, too, are uncertain in action.

The author has been recently most highly gratified in treating a patient who had suffered from confirmed insomnia for at least three months and in whom neither bromides nor ought else, with the exception of morphine, had given the least relief. The de-

pressing after-effects of the morphine were, however, so pronounced that it was only at rare intervals exhibited. In an article in the "New York Medical Journal," March 26, 1898, embodying a report from the services of Drs. J. Rudisch, A. Meyer and A. G. Gerster, attending staff of the Mount Sinai Hospital, attention is called to a synthetic drug of marked value as an analgesic and hypnotic, which, although being powerful, is perfectly safe, even for children. After quoting from a series of one hundred and fifty cases some typical ones of acute suppurative arthritis with general sepsis and pericarditis; empyema with double lobar pneumonia in which various drugs had been ineffectual; and of sacro-sciatic neuritis (all successfully treated), the conclusion is reached that as a hypnotic, even when insomnia is due to causes other than that of severe pain, it (kryofine) is of decided value. This, in view of the case quoted, is, to say the least, a very conservative statement.

Led by this report to test the drug, as yet unknown to me, I directed in the case above cited a teaspoonful of a solution of kryofine fifty grains to four ounces of menstrum (a dose equalling six grains with slight plusage), to be taken on retiring, and that it should be repeated hourly if not effectual. The report to me after the lapse of one week was that within fifteen minutes after taking it he was asleep, and slept for four hours without waking; then after a short time dozed off for the remainder of the night, and on the next day he felt like a new man. He had taken his dose nightly for a week with the same uniform result; the drug not losing its power and no further dose having been required. His general health was certainly greatly improved, with no effects either ill or otherwise apparent from the drug.

For the second week I directed that the kryofine should be taken only every other night. He reports that on the night of taking it he slept well, and on the succeeding night (omission) likewise. The dose was neither increased nor, with one exception, repeated. This was on the evening of the hottest day and night of the season (July 3d), the extreme heat militating strongly against sleep in any one. On that evening he took a second dose two hours after the first, and it proved completely effectual.

Needless to remark, such pronounced results in an intractable case (no other drug during the time having been exhibited) encourage me to make further tests, and the above case has been reported with the view of interesting other observers in the clinical investigation of the drug kryofine.—"Jour. Medicine and Science."

MEDICAL EXCERPT.

By T. P. Corbally, A. M., M. D.

Sugar an Article of Nutrition.—M. A. Chauvaux made a report to the Académie des Sciences ("La France Médicale") on the importance of sugar as an article of nutrition, of which the following are his conclusions:

1. The quantity of sugar or of fat necessary to be added to a given fundamental ration of meat to properly support the person who is actively employed are not isodynamic quantities. The effective value, 0.756 in sugar, acts as well, generally, if not better, than the value 1. in fat. This difference which is so remarkable in favor of sugar is susceptible of being increased in a remarkable degree.

2. Indeed, in regard to sugar, the relation of its nutritive value to the energy produced is not always constant. In certain physiological conclusions, the building of new tissue or the restoration of the anatomical elements of an exhausted organ, this relation may be considerably increased, while, in regard to fat, it remains nearly the same, or is but little increased.

3. The increase observed at any time in the nutritive value of sugar in physiological conditions is most active when this nutritive aliment favors assimilation, by increasing the amount of the albuminoids, and also when its action modifies the work of disassimilation.

4. Then it would be an error to measure the nutritive value of an article of nutrition by its activity as a thermic agent; it would be no less an error to underestimate its nutritive value, or to deduct it exclusively from the power that the nourishment possesses of being transformed more or less economically into muscular glycogen.

5. In fact every element should be judged in regard to its nutritive value by the application of two important tests: (1) Its ability to supply exhaustion directly when lost by the expenditure of energy resulting from physiological acts; (2) the indirect influence which this aliment is capable of exercising on the expenditure of force, and the special changes accompanying the renewal and the restoration of the anatomical elements of the organism.

6. In this double capacity, the superiority of sugar over fat is plainly evident. It is found always and under every circumstance, especially in cases in which function of the renewal and the formation of animal tissues is active.

These facts indicate the importance of the place that sugar has in the process of alimentation.

HOT AIR AS A HEMOSTATIC.—The jet of hot air from a Hollander apparatus directed upon the bleeding surface of a kidney, liver, or severed blood-vessel ("La Semaine Méd.," Aug. 3), will arrest the hemorrhage by the formation of an eschar commencing around the edges and gradually spreading over the entire surface, mechanically checking the flow, in experiments on animals, and Schneider concludes that it would be equally effective on man. The heat is only 39 degrees at 5 mm. from the apparatus, and hence is not sufficient to injure the organ. He found steam less effective and less convenient, for several reasons, masking the field of operation, etc.

COLITIS IN INFANTS is reported, in the same connection, by M. Guinon as an affection seldom located in the large intestines in young children, in whom it more generally assumes the form of gastro-enteritis. In older children the characteristics are more marked, and the diagnosis is more easily made. There is nothing special in the pathological anatomy of this affection; the lesions do not present any special pathognomonic character. The bacteriological history is equally unsatisfactory. The coli-bacillus is found here as it is in most intestinal affections. Before the age of three years, improper food or food of bad quality should be considered as the cause of the colitis; in children over three years, it may generally be attributed to an inherited neuro-arthritic cause. Clinically, it assumes a great variety of forms: it may be acute or chronic, and in either case it may be localized in one part of the large intestine, and M. Guinon lays much stress on the cœcal form, which practitioners too often persist in considering as cases of appendicitis, an affection with which it has no connection whatever. The diagnosis is not always easily made; it may resemble appendicitis, from which it may, however, be distinguished by the fact that the pain is not so distinctly circumscribed; peritonitis, but the passages eliminate this hypothesis; typhoid feved, or dysentery. In colitis the author insists particularly on the retraction of the

abdomen. Colitis may be accompanied with some complications that render the diagnosis difficult. Thus it may be complicated with furuncle, broncho-pneumonia, peritonitis, appendicitis, lithiasis, purpura, etc. As regards the treatment, a carefully considered diet must be strictly insisted upon, and in these cases it must be borne in mind that milk is badly borne, and generally increases the diarrhœa. To avoid relapses it is necessary to prevent constipation by the mildest possible means, and to ensure a daily evacuation of the bowels.

M. Legendre agrees entirely with the conclusions formed by M. Guinon, and insists particularly on the cœcal form of colitis, which, according to him, is a form of the disease well defined; he thinks the theory of appendicitis formulated by M. Dieulafoy is entirely wrong, and, in many cases, the supposed appendicitis is due to an extension of the cœcal lesions.

PATHOLOGY OF THE HEART.—M. Bouchard made a report to the Académie des Sciences ("Le Progrès Médicale," 3d September, last) of some very interesting facts regarding the normal and the pathological physiology of the heart, which were shown by examinations of the organ with the aid of the radioscope.

M. Bouchard used the radiographic apparatus of Dr. Guilleminot, and determined some very interesting facts regarding the physiology of the heart. In a preceding note he showed that the auricles of the heart are dilated during inspiration. If the act of inspiration is sudden, and forcible while the glottis is contracted, the dilatation of the auricles is found to be much greater than normal. As this experiment shows the conditions of the thorax, during inspiration, in attacks of whooping-cough, we would naturally expect to find in the attacks of coughing, during this disease, a dilatation of the heart; and this has been proved by the observations of M. Bouchard.

In two cases of hydropneumothorax he found a very curious condition: a continued movement on the surface of the liquid, the waves of which were produced in a rythm isochronous with the beats of the heart.

> Like some fair hum'rists, LIFE is most enjoy'd,
> When courted least; most worth, when disesteem'd.
>
> —*Young.*

EDITOR'S TABLE.

SANITARIAN, JANUARY, 1899.

☞ All correspondence and exchanges, and all publications for review, should be addressed to the Editor, Dr. A. N. Bell, Brooklyn, N. Y.

REPORT OF THE SURGEON-GENERAL, U. S. NAVY.

The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery, for the past year, accompanied by a set of annual estimates for the fiscal year ending June 30, 1900, and a statistical report showing the health of the navy for the year 1897.

In this report precedence is naturally given to the operations of the Bureau during the war with Spain. From the time of the blowing up of the Maine in the harbor of Havana on February 15, 1898, preparations were made by the Bureau providing for any possible contingency. The naval hospitals were equipped to their full capacity; plans were prepared for building pavilion wards on the hospital grounds to give accommodation to any number of sick or wounded that the Bureau might be called upon to care for. The director of the naval laboratory prepared to furnish medical and surgical supplies in any quantity, at any place, and immediately. No additional expense was incurred until war seemed imminent; then the vessels that were likely to be engaged were supplied with a full outfit of supplies for war. In anticipation of a large number of additional vessels being taken for service, medical and surgical outfits of a kind suitable for the various classes of vessels were bought, assembled, and boxed, ready to be shipped anywhere as soon as called for. There has not been an instance during the war of any vessel having had to wait for her medical stores.

It was known that a corps of volunteer medical officers would be a necessity, and before war was declared or any law passed authorizing their employment, medical boards of examination were established to examine applicants for appointment, such appointment being contingent upon their services being required. As the result of their examination a waiting list of well-educated

medical men was ready, from which appointments were made as soon as their services were required after the declaration of war. Over 2,000 applications were received, but only a small proportion examined. Out of this number 42 were appointed assistant surgeons. They have rendered efficient service and have been a credit to the navy.

One of their number, Assistant Surgeon John Blair Gibbs, was killed in action at Guantanamo while serving with the marine battalion. He was the only medical officer killed during the war.

In addition to the above appointments, 11 passed assistant and 8 assistant surgeons were mustered into the service with the naval reserves from the several States.

The question of proper care and transportation of sick or wounded at sea had long been a subject of consideration by the Bureau. The coming of war gave it an opportunity to demonstrate the wisdom of its propositions and the efficiency of its methods. By direction of the President, and by the authority of the Secretary of the Navy, the steamer Creole, of the Cromwell line, between New York and New Orleans, was purchased, and designated as an ambulance ship. The merchant ship Creole became the ambulance ship Solace in sixteen days, fitted with a large and well-lighted operating room, in which were all the appliances for modern antiseptic surgery, a steam disinfecting apparatus, an ice machine, a steam laundry plant, cold storage rooms, and an elevator for taking patients from the operating room and upper deck to the wards below.

The Solace is fitted out under the requirements of the Geneva Convention, and flies the Geneva cross flag. She is the pioneer in her work, and indicates a step in advance that it well became the United States to take. The vessel has been fortunate in her personnel. Commander Dunlap is an ideal commander, and the medical officers of the vessel, Surgeon Streets and Passed Assistant Surgeons Stokes, Smith, and Bogert, have shown themselves thoroughly competent and efficient in caring for the many sick or wounded who have been under their charge. Three hospital stewards, one of whom was a skilled embalmer, eight trained nurses, a cook, four messmen, and two laundrymen were especially designated for service in the medical department.

The Solace is built of steel; 3,801 tons; 375 feet long; 44 feet beam; draws 21 feet, and has a continuous speed of 16 knots. She can comfortably accommodate 200 patients, either in berths,

swinging cots, or state rooms. The hurricane deck aft is inclosed with canvas for use as a contagious ward, if required. She carries 37,000 gallons of fresh water in tanks, and 800 tons in her double bottom. Distillers and evaporators keep up the supply.

As soon as the Solace received her stores she sailed for the blockading squadron, and arrived in time to take on board the wounded at the bombardment of San Juan. She then collected the sick or wounded from the other vessels of the squadron and sailed for New York, where, on June 5, 57 patients were landed at the naval hospital.

On June 8 she sailed for Guantanamo, and was present to take on board the wounded marines in their fight with the Spanish troops.

As soon as the Spanish fleet was destroyed in the battle of July 3 she took on board the wounded from the Brooklyn and all the Spanish wounded, and gave them the care and attention that has never before been given to the wounded of friend or foe in any naval combat and that could only be given by an ambulance ship. As it was the policy of the department to bring all the sick or wounded from Southern waters to Northern naval hospitals as soon as practicable, so that they might have a better chance for recovery, and there was still space left on the Solace for wounded men, she went to Siboney and took on board 44 army wounded and sailed for Hampton Roads on July 12. On July 16 she landed 44 army wounded at Fortress Montroe and 55 navy sick or wounded and 48 Spanish wounded at the naval hospital, Norfolk. She then went to New York for coal, stores, and an additional ice plant, and sailed August 2 for Key West, where she took on board the sick from the hospitals and vessels in port, and then visited all the vessels on the blockade around Cuba, taking off their sick or wounded and leaving stores. After receiving at Guantanamo the sick brought by the Gloucester from the vessels around Porto Rico, she sailed for Boston, and on August 29 landed 74 sick from the navy and 2 sick soldiers at the Chelsea Naval Hospital. She then coaled and went to New York for repairs and stores, and sailed September 22 for Guantanamo with orders to deliver stores and supplies to all vessels in Cuban or Porto Rican waters, take on board their sick, and then return to New York, bringing, in addition, as many sick or wounded of the army as the vessel could accommodate.

On every trip of the Solace she had gone loaded with medical stores and supplies, and also with delicacies and comforts, which have been supplied in abundance for the sick or wounded by generous and patriotic individuals and societies from every part of the United States. Among the contributions to the Solace were a carbonator and deck awning from the Rhode Island Sanitary and Relief Association, an X-ray apparatus from the National Society of Colonial Dames, and conveyance boxes for sterilized dressings from the Elizabeth (N. J.) members of the National Society of Colonial Dames.

In this war woman has done her perfect work, and the Medical Department of the navy is profoundly grateful for the money contributed and supplies furnished for the aid and comfort of the sick or wounded of the navy. Patriotic women have ably supplemented the efforts of the Government, and their assistance has been thoroughly appreciated.

The contributions soon became so numerous that it was necessary to have a medical officer detailed to receive them. Medical Director Bloodgood was assigned to the duty, and he has received and distributed the stores and attended to the voluminous correspondence with the same business ability he manifested when on the active list.

Four young women from the Johns Hopkins Medical School volunteered their services as nurses, and were assigned to duty at the naval hospital, Brooklyn, N. Y. Six women nurses from the registered list of the Daughters of the American Revolution and five Sisters of Charity at Norfolk also volunteered, and were assigned to duty at the naval hospital, Norfolk, Va. All of these women have done their work thoroughly and conscientiously.

The medical officers of the Naval Reserves, who were transferred to the service with the reserves from their States, rendered efficient service and willingly responded to every call made upon them.

The Bureau is under obligations to the Surgeon-General of the army and to the Supervising Surgeon-General of the Marine Hospital Service for caring for the sick or wounded of the navy in the hospitals under their charge at Key West.

When the department decided to remove the prisoners from the destroyed Spanish fleet at Santiago to Portsmouth, N. H., immediate preparation was necessary to care for the sick. Two pavilions were built, from plans already prepared, adjoining the naval

hospital at Portsmouth. Telegraphic orders were issued for bedsteads, mattresses, bedding, stores and supplies. Additional medical officers and nurses were sent, and when the vessels arrived with the prisoners the well men found comfortable barracks and the sick comfortable hospitals, to which they were immediately transferred. They were lodged, fed and clothed as though they were expected guests. The navy has reason to feel proud of this five days' work. One hundred equipped cots and six trained nurses were generously supplied by the Red Cross Society after the hospital was established.

On June 17 the President approved an act of Congress organizing a hospital corps of the navy. The passage of this act is the culmination of the efforts of the Bureau for many years. It will give the service a trained corps of men who will now have some reason for remaining in service, having a hope of promotion and advancement as the result of faithful service, sobriety and attention to duty.

I cannot close this portion of the Bureau's report without bearing testimony to the efficiency, skill and devotion to duty of the personnel of the Medical Department. Not a word but of praise has the Bureau heard of any of them—regulars or volunteers. When war was imminent they vied one with another in their efforts to get on fighting ships. Some have had greater opportunities than others, but all have done well the work assigned them. Surgeon Edgar saw his associate, Assistant Surgeon Gibbs, shot by his side in the Spanish attack, and he continued his work alone, doing it thoroughly and well, as it was known he would.

The medical officers of the vessels in the fight at Manila and in the battle of the 3d of July shared the dangers of their comrades, and should participate in the praise accorded to them.

The medical officers of the Solace have the honor of inaugurating the first complete system of antiseptic surgery at sea. They have adapted means to ends, have improvised apparatus, have been fertile in expedients, and have the satisfaction of having demonstrated that with skill and intelligence the percentage of mortality among the patients on a well-equipped ambulance ship will be no greater than in the hospitals on shore.

Medical Inspector Persons found himself suddenly confronted with 226 Spanish sick or wounded prisoners in a hastily established hospital. He was equal to the emergency, and he and his

associates were complimented by Admiral Cervera when he visited the camp.

The medical officers of the other hospitals have had sudden large accessions of patients. They were always ready and always cared for them well.

The director of the laboratory (our receiving and distributing depot of supplies) applied his well-known energy to the work, and never failed to have supplies ready whenever and wherever required. Those whose services have not been so conspicuous have done their duty in the stations assigned them, and have contributed their share toward the efficiency of the Medical Department of the navy.

Expenditures on, the condition of and estimates for the needs of naval hospitals, cemeteries, navy-yards, naval stations, receiving ships, and the Museum of Hygiene, follow. While, on the whole, these appurtenances are practical, several of them are shown to be lacking in sanitary conditions and facilities.

The medical corps, *for the first time in thirty-five years,* has reached the limit established by law. This condition is among the other excellent results of the Surgeon-General's timely and energetic action in anticipation of the war. This anticipation, too, was doubtless a spur to applicants. During the fiscal year ending June 30, 1898, the department received 829 applications for information concerning the conditions for appointment as assistant surgeons, and during the same period 248 permits to appear before examining boards were issued. Sixty-five candidates appeared; of these 17 were found qualified and appointed.

The yellow fever outbreak at Key West, Fla., about the middle of August, 1898, was so promptly and effectively dealt with that in a little less than one month it was stamped out. There were in all fourteen cases; the last occurred Sept. 14. All recovered.

The health record of the Navy and Marine Corps for the calendar year 1897 shows an improvement over that for 1896, the ratio of admissions to the sik list per 1,000 of strength being 748.24, as against 777.75 for the previous year. The rate for 1895 was 838.53.

The average strength of the active list for 1897 was 15,734, an increase in the force of the Navy and Marine Corps of 1,538.

Complete returns were received by the Medical Department from a force of 15,229, giving a difference of 505 persons from whom no regular returns were received, representing those on de-

tached service and on leave. As reports of medical survey and certificates of death, however, are received from the total force, this strength is employed in computing ratios of deaths and discharges from the service for disability, and the average strength, as shown by medical returns, in calculating all other ratios.

The total number of admissions for disease was 9,053, and for injuries 2,342, affording a ratio per 1,000 of strength of 594.46 and 153.79, respectively. The ratios for 1896 were 628.42 and 149.33.

The daily average of patients was 454.08, giving a ratio per 1,000 of strength of 29.82 as against 29.71 for 1896. The total number of sick days was 165,741, giving an average of 10.88 days for each man of the Navy and Marine Corps, and 14.55 days as the duration of treatment per case.

In 1896 the average number of sick days for each man was 10.87, and the average number of days each case was treated, 13.98.

The number of persons invalided from service (including retirements of officers for disability and transfers to the Government Hospital for the Insane) was 328, a ratio of 20.85 per 1,000 of force; for previous year, 17.19.

Of the total discharges 281 were for disease and 47 on account of injuries.

The number of deaths was 88, giving a ratio of 5.59 per 1,000 of strength; the ratio for 1896 was 5.49.

Fifty-six of the deaths resulted from disease and 32 from injuries, including cases of poisoning.

During the year 841 cases of malarial diseases were admitted to the sick list (850 in 1896), 710 of wounds (593 in 1896), 573 of rheumatic affections (586 in 1896), 526 of diarrhœal affections (468 in 1896), 81 of heat stroke (59 in 1896), 52 of typhoid fever (56 in 1896), 52 of pneumonia (66 in 1896), 58 of pneumonic tuberculosis (48 in 1896), 21 of scarlet fever (4 in 1896) and 3 cases of small-pox as against 5 cases for previous year.

There were no cases of yellow fever or cholera during the year.

There were vaccinated during the year 5,441 persons, with a percentage of success of 34.03. This is an increase over the previous year, when the percentage of success was 25.37.

Of the force afloat during the year 1897, 12,204, the average number of admissions to the sick list per man on the cruising vessels on the North Atlantic Station was 0.75; on those of the Pacific Station, 0.67; those of the South Atlantic Squadron, 0.80; on

those of the European Squadron, 0.75; in the Asiatic Squadron, 0.76; on the Northwestern Lakes, 0.24; and on the receiving ships, 0.68. The ratios for the previous year were 0.77, 0.68, 0.86, 0.83, 0.75, 0.41, and 0.72, respectively.

The admissions for general infectious diseases (non-venereal) were in the ratio of 127.17 per 1,000, as against 128.46 for 1896; diseases of the nervous system, 54.16 (previous year 66.40); diseases of the digestive apparatus, 112.91 (previous year 119.90); diseases of the respiratory apparatus, 51.04 (previous year 60.23), and of venereal diseases and diseases of the genito-urinary apparatus, 98.98, as against 98.44 for 1896.

The deaths numbered 34, which is in the ratio of 2.79 per 1,000, being a slight increase over the deaths afloat for 1896 (2.67 per 1,000).

The number invalided from service was 59, the ratio per 1,000 of force being 4.83, as against 4.21 for the previous year.

There were 1,168 transfers to hospital, giving a ratio of 95.71 per 1,000, as against 81.41 for 1896.

THE NATIONAL HEALTH SERVICE awaits the action of Congress for improvement. Meanwhile the Marine Hospital Service is proceeding with eminently praiseworthy action in the initiation of preventive measures against the toleration of yellow fever in, and its exportation from, our new West India possessions.

The National Board of Trade at its recent session in Washington, Dec. 14,

"Resolved, That the National Board of Trade reaffirms its declaration in favor of a national quarantine law, and, further, most respectfully urges upon the Congress of the United States the establishment of a National Board of Health."—

Thus eliminating the New York Board of Trade's resolution, a week before, endorsing and urging the Spooner blanket bill, and leaving the question open for such amendments to existing laws as would evolve a national board or bureau on the existing basis of the Marine Hospital Service.

The December number of the Memphis "Medical Journal" contains an elaborate article under the caption of "National Control of Epidemic Diseases," by Dr. Kraus, of Memphis, member of the Tennessee State Board of Health, which cleverly states the embarrassments that would be likely to follow the establishment of

a board or "department of health, composed of an advisory aggregation of forty odd members," as provided for in the Spooner bill.

Indeed, such a board, constituted of the same heterogeneous and conflicting interests as have obtained hitherto, could hardly be otherwise than the perpetuation of the same obstacles to commerce and sanitation as have characterized all previous attempts at reconciliation among themselves or with the national quarantine service.

Dr. Kraus points out with emphasis the fact that the Marine Hospital Service is the only medical organization that has been systematically accumulating experience and information on the control of epidemic diseases. Moreover, he cites not only the successful administration of its twenty-four quarantine stations on the seaboard, but its investigations and service in other respects:

"It examines life-savers, pilots and candidates for the revenue service, and inspects immigrants at eight important ports of entry; it has investigated scurvy, cholera, yellow fever, small-pox and the plague, with special reference to their causation and prevention; and in its hygienic laboratory has studied diphtheria, pneumonia, vaccinia, small-pox, and typhoid and malarial fevers, and has tested various disinfectants; it has instituted inquiries concerning water supplies and the disposal of sewage and garbage in cities and towns, and has investigated cases of water pollution; it has studied foreign and domestic quarantine administration, from which it has collected and tabulated sanitary reports and statistics of great value, etc.

"It is also conducting a hygienic school for State and local health officers. This effectually disposes of the argument that the Marine Hospital Service is only a service for sick sailors.

"In view of all that has been said, then, I believe that Congress should empower the Marine Hospital Service to take entire charge of epidemic work, with a local officer at each important point, whose duty it should be to give personal attention to all diseases of an epidemic character. The details of the Caffery amendment are in the main satisfactory. Local and State boards should have only secondary jurisdiction in such matters, and only so far as they and their own communities are concerned. They would have ample scope in general sanitation and management of endemic diseases, the same as in States not threatened with epidemics."

MORTALITY REPORTS.

Correspondents under this head are particularly requested to be as prompt as possible.

State of New York, 6,789,313, Oct., '98: Total deaths, 9,632; under 5 years, 2,868; annual death rate per 1,000, 16.50; from typhoid fever, 281; diphtheria, 180; phthisis, 1,052; acute respiratory diseases, 1,044.

City of New York, 3,438,899, Oct., '98: Total deaths, 5,096; under 5 years, 1,377; annual death rate per 1,000, 18.0; from typhoid fever, 109; diphtheria, 107; phthisis, 630; actute respiratory diseases, 703.

Borough of Manhattan, 1,911,755, Oct., '98: Total deaths, 2,852; under 5 years, 1,051; annual death rate per 1,000, 18.0; from typhoid fever, 56; diphtheria, 64; phthisis, 324; acute respiratory diseases, 437.

Borough of the Bronx, 137,035, Oct., '98: Total deaths, 308; under 5 years, 88; annual death rate per 1,000, 27.0; from typhoid fever, 3; diphtheria, 3; phthisis, 89; acute respiratory diseases, 30.

Borough of Brooklyn, 1,197,100, Oct., '98: Total deaths, 1,655; under 5 years, 626; annual death rate per 1,000, 16.2; from typhoid fever, 45; diphtheria, 34; phthisis, 189; acute respiratory diseases, 211.

Borough of Queens, 128,042, Oct., '98: Total deaths, 170; under 5 years, 72; annual death rate per 1,000, 16.0; from typhoid fever, 4; diphtheria, 4; phthisis, 14; acute respiratory diseases, 15.

Borough of Richmond, 64,927, Oct., '98: Total deaths, 111; under 5 years, 40; annual death rate per 1,000, 20.5; from typhoid fever, 1; diphtheria, 2; phthisis, 14; acute respiratory diseases, 10.

Albany, N. Y., 100,000, Oct., '98: Total deaths, 156; under 5 years, 36; annual death rate per 1,000, 18.7; from typhoid fever, 5; diphtheria, 4; phthisis, 24; acute respiratory diseases, 17.

Troy, N. Y., 65,000, Oct., '98: Total deaths, 105; under 5 years, 31; annual death rate per 1,000, 19.3; from typhoid fever, 7; diphtheria, 1; phthisis, 12; acute respiratory diseases, 17.

Utica, N. Y., 55,000, Oct., '98: Total deaths, 83; under 5 years, 24; annual death rate per 1,000, 18.1; from diphtheria, 4; phthisis, 12; acute respiratory diseases, 5.

Syracuse, N. Y., 120,000, Oct., '98: Total deaths, 126; under 5 years, 22; annual death rate per 1,000, 12.6; from typhoid fever, 8; diphtheria, 4; phthisis, 17; acute respiratory diseases, 5.

Buffalo, N. Y., 360,000, Oct., '98: Total deaths, 362; under 5 years, 106; annual death rate per 1,000, 12.0; from typhoid fever, 11; diphtheria, 9; phthisis, 35; acute respiratory diseases, 42.

Rochester, N. Y., 175,000, Oct., '98: Total deaths, 178; under 5 years, 48; annual death rate per 1,000, 12.2; from typhoid fever, 5; diphtheria, 3; phthisis, 12; acute respiratory diseases, 18.

Yonkers, N. Y., 40,000, Oct., '98: Total deaths, 67; under 5 years, 30; annual death rate per 1,000, 20.2; from diphtheria, 1; phthisis, 7; acute respiratory diseases, 11.

Cohoes, N. Y., 24,000, Oct., '98: Total deaths, 36; under 5 years, 13; annual death rate per 1,000, 18.0; from typhoid fever, 4; phthisis, 2; acute respiratory diseases, 3.

Kingston, N. Y., 25,500, Oct., '98: Total deaths, 30; under 5 years, 7; annual death rate per 1,000, 15.0; from phthisis, 4; acute respiratory diseases, 1.

Poughkeepsie, N. Y., 23,200, Oct., '98: Total deaths, 38; under 5 years, 8; annual death rate per 1,000, 19.0; from typhoid fever, 1; diphtheria, 2; phthisis, 5; acute respiratory diseases, 4.

Newburgh, N. Y., 24,536, Oct., '98: Total deaths, 34; under 5 years, 6; annual death rate per 1,000, 16.0; from typhoid fever, 2; phthisis, 6; acute respiratory diseases, 2.

Schenectady, N. Y., 24,374, Oct., '98: Total deaths, 22; under 5 years, 7; annual death rate per 1,000, 12.0; from phthisis, 3; acute respiratory diseases, 3.

Binghamton, N. Y., 34,514, Oct., '98: Total deaths, 34; under 5 years, 9; annual death rate per 1,000, 12.0; from typhoid fever, 1; diphtheria, 1; phthisis, 5; acute respiratory diseases, 1.

Elmira, N. Y., 30,000, Oct., '98: Total deaths, 37; under 5 years, 5; annual death rate per 1,000, 14.8; from typhoid fever, 3; phthisis, 4.

Oswego, N. Y., 22,000, Oct., '98: Total deaths, 27; under 5 years, 7; annual death rate per 1,000, 14.7; from typhoid fever, 2; phthisis, 2; acute respiratory diseases, 1.

San Francisco, Cal., 360,000, Oct., '98: Total deaths, 586; under 5 years, 126; annual death rate per 1,000, 19.5; from typhoid fever, 14; diphtheria, 6; phthisis, 50; acute respiratory diseases, 41.

Denver, Col., 167,000, Oct., '98: Total deaths, 158; under 5 years, 25; annual death rate per 1,000, 9.6; from typhoid fever, 9; diphtheria, 7; phthisis, 24; acute respiratory diseases, 18.

Connecticut, 168 towns, 890,160, Oct., '98: Total deaths, 1,109; under 5 years, 308; annual death rate per 1,000, 14.9; from typhoid fever, 44; diphtheria, 28; phthisis, 111; acute respiratory diseases, 97.

New Haven, Conn., 112,000, Oct., '98: Total deaths, 125; under 5 years, 43; annual death rate per 1,000, 12.7; from typhoid fever, 7; diphtheria, 1; phthisis, 13; acute respiratory diseases, 14.

Hartford, Conn., 80,000, Oct., '98: Total deaths, 113; under 5 years, 25; annual death rate per 1,000, 14.1; from typhoid fever, 12; diphtheria, 2; phthisis, 13; acute respiratory diseases, 6.

Bridgeport, Conn., 65,000, Oct., '98: Total deaths, 82; under 5 years, 29; annual death rate per 1,000, 14.7; from diphtheria, 5; phthisis, 11; acute respiratory diseases, 5.

Waterbury, Conn., 45,000, Oct., '98: Total deaths, 49; under 5 years, 23; annual death rate per 1,000, 13.0; from typhoid fever, 3; diphtheria, 2; phthisis, 3; acute respiratory diseases, 4.

District of Columbia, 280,250, 4 weeks. Nov. 26, '98: Total deaths, 436; under 5 years, 103; annual death rate per 1,000, 20.1; from typhoid fever, 20; diphtheria, 27; phthisis, 56; acute respiratory diseases, 36.

Florida, 45 counties, 391,422, Sept., '98: Total deaths, 678; under 5 years, 176; annual death rate per 1,000, 19.8; from typhoid fever, 198; diphtheria, 2; phthisis, 28; acute respiratory diseases, 19.

Chicago, Ill., 1,750,000, Oct., '98: Total deaths, 1,607; under 5 years, 497; annual death rate per 1,000, 13.9; from typhoid fever, 62; diphtheria, 59; phthisis, 163; acute respiratory diseases, 150.

Indiana, 87 counties, July, '98: Total deaths, 4,364; from typhoid fever, 248; diphtheria, 89; phthisis, 462; acute respiratory diseases, 80.

Dubuque, Iowa, 45,000, Oct., '98: Total deaths, 31; annual death rate per 1,000, 8.2; from typhoid fever, 3; diphtheria, 5; phthisis, 2; acute respiratory diseases, 1.

Davenport, Iowa, 36,000, Oct., '98: Total deaths, 28; annual death rate per 1,000, 9.3; from diphtheria, 2; phthisis, 2; acute respiratory diseases, 1.

Baltimore, Md., 506,398, Sept., '98: Total deaths, 870; under 5 years, 366; annual death rate per 1,000, 20.6; from typhoid fever, 33; diphtheria, 45; phthisis, 60; acute respiratory diseases, 42.

Boston, Mass., 528,912, Oct., '98: Total deaths, 896; under 5 years, 302; annual death rate, 20.3; from typhoid fever, 33; diphtheria, 9; phthisis, 102; acute respiratory diseases, 127.

Michigan, 2,170,350, Oct., '98: Total deaths, 2,414; under 5 years, 662; annual death rate per 1,000, 12.3; from typhoid fever, 108; diphtheria, 45; phthisis, 208; acute respiratory diseases, 114.

Detroit, Mich., 300,000, year June 30, '98: Total deaths, 4,604; under 5 years, 809; annual death rate per 1,000, 19.6; from typhoid fever, 48; diphtheria, 125; phthisis, 236; acute respiratory diseases, 485.

St. Paul, Minn., 215,582, Oct., '98: Total deaths, 126; under 5 years, 45; annual death rate per 1,000, 7.0; from diphtheria, 16; phthisis, 17; acute respiratory diseases, 5.

Minneapolis, Minn., 225,602, Oct., '98: Total deaths, 147; under 5 years, 38; annual death rate per 1,000, 9.0; from typhoid fever, 10; diphtheria, 6; phthisis, 17; acute respiratory diseases, 14.

St. Louis, Mo., 623,000, Oct., '98: Total deaths, 629; under 5 years, 191; annual death rate per 1,000, 12.0; from typhoid fever, 12; diphtheria, 12; phthisis, 77; acute respiratory diseases, 55.

Kansas City, Mo., 200,000, Oct., '98: Total deaths, 159; under 5 years, 44; annual death rate per 1,000, 9.5; from typhoid fever, 4; diphtheria, 4; phthisis, 2; acute respiratory diseases, 3.

Newark, N. J., 235,000, 3 weeks, Nov. 19, '98: Total deaths, 202; under 5 years, 99; annual death rate per 1,000, 14.8; from typhoid fever, 5; diphtheria, 14; phthisis, 30; acute respiratory diseases, 39.

Paterson, N. J., 113,116, Oct., '98: Total deaths, 166; under 5 years, 65; annual death rate per 1,000, 14.6; from typhoid fever, 8; diphtheria, 5; phthisis, 17; acute respiratory diseases, 10.

North Carolina, 95,548, Oct., '98: Total deaths, 94; under 5 years, 25; annual death rate per 1,000, 12.2; from typhoid fever, 2; phthisis, 9; acute respiratory diseases, 6.

25 towns, 69,640, Oct., '98: Total deaths, 134; under 5 years, 45; annual death rate per 1,000, 23.1; from typhoid fever, 4; phthisis, 16; acute respiratory diseases, 5.

Asheville, N. C., 13,000, Oct., '98: Total deaths, 19; under 5 years, 4; annual death rate per 1,000, 17.5; from phthisis, 5; acute respiratory diseases, 2.

Charlotte, N. C., 26,153, Oct., '98: Total deaths, 28; under 5 years, 12; annual death rate per 1,000, 12.8; from diphtheria, 2; phthisis, 4; acute respiratory diseases, 2.

Raleigh, N. C., 16,000, Oct., '98: Total deaths, 18; under 5 years, 5; annual death rate per 1,000, 13.5; from phthisis, 1; acute respiratory diseases, 3.

Wilmington, N. C., 26,500, Oct., '98: Total deaths, 68; under 5 years, 23; annual death rate per 1,000, 30.8; from phthisis, 4; acute respiratory diseases, 1.

Ohio, 54 towns, 1,149,773, 5 weeks, Oct. 1, '98: Deaths from typhoid fever, 35; diphtheria, 27.

Cincinnati, O., 405,000, Sept., '98: Total deaths, 391; under 5 years, 112; annual death rate per 1,000, 11.5; from typhoid fever, 7; diphtheria, 3; phthisis, 41; acute respiratory diseases, 31.

Cleveland, O., 370,000, Oct., '98: Total deaths, 340; under 5 years, 122; annual death rate per 1,000, 11.0; from typhoid fever, 21; diphtheria, 21; phthisis, 18; acute respiratory diseases, 21.

Philadelphia, Pa., 1,240,266, 1 week, Nov. 26, '98: Total deaths, 449; under 5 years, 121; annual death rate per 1,000, 18.8; from typhoid fever, 10; diphtheria, 35; phthisis, 54; acute respiratory diseases, 70.

Pittsburg, Pa., 295,000, 4 weeks, Nov. 26, '98: Total deaths, 364; under 5 years, 112; annual death rate per 1,000, 15.9; from typhoid fever, 17; diphtheria, 15; phthisis, 18; acute respiratory diseases, 58.

Newport, R. I., 21,500, Oct., '98: Total deaths, 25; under 5 years, 5; annual death rate per 1,000, 13.9; from typhoid fever, 1; diphtheria, 2; phthisis, 5; acute respiratory diseases, 3.

Charleston, S. C., 65,165, 4 weeks, Nov. 26, '98: Total deaths, 129; under 5 years, 29; annual death rate per 1,000, 23.2; from typhoid fever, 2; phthisis, 17; acute respiratory diseases, 3.

Memphis, Tenn., 61,747, Oct., '98: Total deaths, 108; under 5 years, 26; annual death rate per 1,000, 15.3; from typhoid fever, 2; diphtheria, 1; phthisis, 18; acute respiratory diseases, 10.

San Antonio, Tex., 55,000, year May, '98: Total deaths, 1,169; under 5 years, 250; annual death rate per 1,000, 14.5; from typhoid fever, 21; diphtheria, 14; phthisis, 271; acute respiratory diseases, 68.

Salt Lake City, Utah, 70,000, year 1897: Total deaths, 577; under 5 years, 140; annual death rate per 1,000, 8.2; from typhoid fever, 23; diphtheria, 7; phthisis, 44; acute respiratory diseases, 93.

Seattle, Wash., 70,000, Oct., '98: Total deaths, 46; under 5 years, 12; annual death rate per 1,000, 7.8; from typhoid fever, 1; diphtheria, 3; phthisis, 3; acute respiratory diseases, 3.

Milwaukee, Wis., 280,000, Oct., '98: Total deaths, 247; under 5 years, 109; annual death rate per 1,000, 10.4; from typhoid fever, 4; diphtheria, 7; phthisis, 24; acute respiratory diseases, 13.

Mexico, 344,377, Sept., '98: Total deaths, 1,159; under 5 years, 531; annual death rate per 1,000, 40.37; from typhus, 28; diphtheria, 1; phthisis, 132; acute respiratory diseases, 188.

INFECTIOUS DISEASES REPORTED PREVALENT SINCE NOVEMBER 1st.

Diphtheria: St. Paul, Minn.; New Castle, Pa.; Andover, Mass.; Mt. Zion, Ky.; Indian Orchard, Mass.; Somerset, O.; Detroit, Mich.; St. Louis, Mo.; St. Joseph, Mo.; Scranton, Pa.; Baltimore, Md.; Oswégo, N. Y.; Waterloo, Ontario.

Typhoid Fever: Borough of Bronx, New York City; Camden, N. J.; Pittsburg, Pa.; Williamsport, Pa.; Philadelphia, continues; Cohoes, N. Y.

Small-pox: Bedford, Pa.; Phillipsburg, O.

To KEEP OUT YELLOW FEVER.—The Mobile "Register," in urging upon the city of Mobile the establishment of a modern system of sewerage, calls attention to the experience of Santiago de Cuba, famed as a pest hole and the home of yellow fever the entire year around. The experience of Santiago furnishes Mobile and New Orleans an example, thinks the "Register." And that paper continues: "Not only that, but it is evidence that if the Southern coast cities, especially such as New Orleans and Mobile, will apply the same remedy they themselves may be placed in a position where yellow fever will have no terrors for them. Both of these cities are among the oldest in the United States, yet neither one has a modern sewerage system, and what sanitary system they have had has for a century been carried out in a perfunctory manner until danger is seen ahead, and then there is a wild rush to dispose of the accumulations of years inside of as many weeks. It has been common to denounce the people of Havana and of Santiago for their criminal carelessness in the matter of preserving and protecting the health of their people, but until New Orleans and Mobile adopt some modern method of sanitation they can have no just cause to cast stones at anybody else."

THE PLAGUE AT VIENNA.—The "Practitioner" for December

well says: "If there be any still so incredulous as to doubt the association of particular microbes with specific disease, not as accidental or even constant accompaniments, but as the essential and efficient causes, or to dispute the claim of Prof. Kitasato to the discovery of the specific bacillus of the plague, the recent outbreak at Vienna should be sufficient to convince them. The disease had disappeared from Central Europe for over a century, and had not been observed even on the shores of the Black Sea or the Levant for fifty or sixty years, when it escaped from flasks and tubes in the laboratory and attacked Dr. Müller and the laboratory attendant, Barisch, four nurses who attended these patients contracting it, and one of them, as well as Dr. Müller and the attendant, succumbing. This is, we believe, the first instance in which a culture has led to further consequences than the infection of the individual, whether through his own carelessness or, as with the late Dr. Obermeyer, through his making himself the object of his experiments. Yet we must praise the firmness of Count Thun in resisting the popular outcry, and refusing to suppress researches intended for the benefit of mankind. That Nurse Pecha lingered on for eleven days, while Barisch and Dr. Müller succumbed in three or four, may have been due to the injections of serum to which she submitted but which the doctor refused. At the same time, it would seem to show that, there having been no delay in its employment, the serumtherapy of the plague has not attained the accuracy of that of diphtheria, and that the experiments on which Dr. Müller was engaged must be continued if we are to obtain a sure preventive or an effective antidote. Deductions from the subsequent incidence of the disease, or the mortality among mixed masses of the population, partly inoculated and partly not, are of little or no value unless drawn from the observation of long periods or of settled and civilized communities, as has been done with vaccination."

"SCOTT'S SANITARY BUCKET" is the name given by the inventor to a glass crock holding five pints, and designed for keeping butter, etc., in cellars and ice-boxes free from the taint of vegetables and the like. It has a glass cover as wide as the jar, with a bail for carrying. Its especial value for medical men is for the preservation of pathological specimens—it will comfortably hold a brain—and convenient carrying to and from medical societies. It is made of clear glass, and is strong. A number of surgeons and physicians have purchased them for such use. Mrs. W. J. Scott,

of 1944 Central Avenue, is the inventor. The jars are made at Cicero, Ind., by the Banatta Glass Company. Hollweg & Reese, queensware dealers in Indianapolis, will supply the city demand. The price to physicians is $9 a dozen for selected and carefully ground jars. This is not a paid notice, but is written to call attention to a useful article often needed by physicians.—Indiana "Medical Journal."

SOAP AS A GERMICIDE.—Dr. Reithoffer has recently published ("Scientific American," Sept. 24, 1898) the results of some experiments carried out by him with various kinds of soap, having for object to determine their value as microbicides. He used the ordinary mottled soap, white almond soap perfumed with nitrobenzine, and hard potash soap. He found that these soaps were very inimical to the cholera microbe, a 1 per cent. solution killing them in a short space of time, while a 5 per cent. solution of the potash soap killed them in five minutes. We are, therefore, at liberty to infer that, as in washing the hands the strength of the soap solution is never less than 5, and may go as high as 45 per cent., this method of disinfecting the hands, as well as the clothes, etc., is fairly trustworthy. Much stronger solutions are required, however, to destroy the bacilli of typhoid, the coli bacillus, etc., not less than 10 per cent. being sufficient. None of the soaps experimented with appeared to have any effect on the pyogenic microbe. The practical result of these investigations is that it is always preferable to use soap and water first of all, rinsing the hands in the disinfectant solution afterward. This is an important point and should be generally made known.

ARKANSAS' NEW STATE BOARD OF HEALTH, appointed Oct. 4: Drs. H. C. Dunavant, J. M. Park, Wm. H. Miller, R. B. Christian, of Little Rock; W. C. Russworm, of Helena; W. C. Sherman, of Texarkana. Drs. Dunavant and Park were reappointed from the old board.

DR. JAMES F. HIBBERD, the "grand old man" of the Indiana health movement and health officer of Wayne county for the past nineteen years, has refused reappointment and will retire to private life on account of a desire to rid himself of all other work than his private practice, his advancing years making it impossible for him to carry on his many outside duties.

TO REGULATE EXPRESS CHARGES.—The Merchants' Association of this city recently sent out over 30,000 copies of a pamphlet

entitled "To Regulate Express Charges." This pamphlet contains an analysis of those charges, as compared with freight charges to some 300 towns in all parts of New York State, and shows a large excess of charges by express for the same weight and distance as compared with freight charges. A letter sent out by the Merchants' Association says, among other things: "There is one point which the citizens and merchants must not forget, and that is that the express companies claim that they pay 40 per cent. of their charges to the railroad company, retaining 60 cents out of the dollar. This 60 cents is 150 per cent. on the investment with which to pay their terminal charges and other expenses. Any person of intelligence can judge for himself whether this is a just condition.

"In this whole matter the Merchants' Association is simply showing up the disproportion of rates, and is asking that the express companies be placed under the control of the State Railway Commission, so that they may make their business public, the same as in the case of railroads and other transportation lines. As the matter now stands it is impossible for anybody to tell anything about the express charges or what the earnings of the companies are. The capital invested ought certainly to be allowed to bring a reasonable margin of profit to the investors, but according to the analysis made by the Merchants' Association of the express companies' charges the return is out of all proportion to the investment."

BOOK REVIEWS.

SEWERAGE—THE DESIGNING, CONSTRUCTION, AND MAINTENANCE OF SEWERAGE SYSTEMS. By A. PRESCOTT FOLWELL, Member American Society of Civil Engineers. 8vo. X+372 pages. Cloth, $3.00. Order through your bookseller, or copies will be forwarded postpaid by the publishers on the receipt of the retail price. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1898.

A concise practical work on the different systems of sewerage, without attempting to treat the subject of sewage disposal at length, because that subject appears to be fully discussed in works to which the author refers. It embodies the most recent data and ideas relating to the subject and treat of both the combined and separate systems in a comprehensive manner.

While primarily intended for practising engineers, the work is arranged with reference to its usefulness as a text-book in engineering schools. It is divided into three parts: Design, Construction and Maintenance; and these severally into details. Part first, into six chapters: System to be employed, requirements, etc.; disposal; amount; flow; flushing and ventilation; collecting the data; the design; detail plans; specifications, contract, estimate of cost. And in like manner, Construction and Maintenance: comprehending all the details in a relatively small amount of space, elucidated with numerous diagrams and rendering it altogether an eminently facile work for the student, while it is also a work of utility to the practising engineer.

PRACTICAL URANALYSIS AND URINARY DIAGNOSIS: A MANUAL FOR THE USE OF PHYSICIANS, SURGEONS, AND STUDENTS. By CHARLES W. PURDY, M. D., LL.D. (Queen's University); Fellow of the Royal College of Physicians and Surgeons, Kingston; Professor of Clinical Medicine at the Chicago Post-Graduate Medical School. Author of "Bright's Disease and Allied Affections of the Kidneys"; also of "Diabetes: Its Causes, Symptoms, and Treatment." Fourth, Revised Edition. With numerous illustrations, including photo-engravings and colored plates. In one crown octavo volume, 365 pages, bound in extra cloth, $2.50 net. The F. A. Davis Co., Publishers, 1914-16 Cherry Street, Philadelphia; 117 W. Forty-second Street, New York City; 9 Lakeside Building, 218-220 S. Clark Street, Chicago, Ill.

This is a very complete work and admirably gotten up. The fact that three large editions of it have been exhausted within three years of its first appearance attests its appreciation by the profession and its pre-eminent usefulness as a text-book for students—"upward of sixty medical colleges in the United States having adopted it." Some important changes and additions have been made in and to this fourth edition in order to keep abreast with the recent advances in this important field of study. A number of new illustrations added and several chapters largely rewritten. No other book on the subject of uranalysis and the diagnosis of the diseases of the urinary organs, with which we are acquainted, is equal to it.

A PRIMER OF PSYCHOLOGY AND MENTAL DISEASE FOR USE IN TRAINING SCHOOLS FOR ATTENDANTS AND NURSES AND IN MEDICAL CLASSES. By C. B. BURR, M. D., Medical Director of Oak

Grove Hospital for Nervous and Mental Diseases, Flint, Mich.; formerly Medical Superintendent of the Eastern Michigan Asylum; Member of the American Medico-Psychological Association, etc. Second Edition, thoroughly revised. 5¼x7¾ inches. Pages ix—116. Extra cloth, $1.00 net. The F. A. Davis Co., Publishers, 1914-16 Cherry Street, Philadelphia; 117 W. Forty-second Street, New York City; 9 Lakeside Building, 218-20 S. Clark Street, Chicago, Ill.

It is gratifying to know prefatorily that this primer on a comparatively new subject has become a text-book for medical students. Based, as it is, on strictly physiological grounds, it is well calculated to counteract and to do away with superficial knowledge of the subject of which it treats by pretenders. Psychology is here clearly defined and differentiated in its relation to the human organism, as knowledge of the functions of the brain in disease as well as in health, and so turned to the best account in both the promotion of health and the cure of disease. Moreover, to this second edition is added "Management of Cases of Insanity," a valedictory address to the class of 1895 of the Training School for Attendants of the Eastern Michigan Asylum, materially adding to the practical utility of the book.

THE PHONENDOSCOPE AND ITS PRACTICAL APPLICATION. By AURELIO BIANCHI, M. D., Professor of Preparatory Clinical Medicine and Pathology, Parma. With thirty-seven illustrations. Translated by A. GEORGE BAKER, A. M., M. D., Physician-in-Chief of the Chinese Medical Dispensary, Philadelphia, and author of prize essays "The Revival of Learning" and "The Germans in America," etc. Price 50 cents.

(Chapters I, II and III are the English translation of lectures delivered by Prof, Bianchi, and it is the direct intention of the publishers that this book shall not be mistaken for the complete book on Phonendoscopy in course of preparation.)

Philadelphia: George P. Pilling and Son.

A substantial octavo of seventy-seven pages, describing the "Phonendoscope" and its advantages as a substitute for the old stethoscope. It gives a brief sketch of the stethoscope, its different phases and development into the phonendoscope—"an instrument which carries to the outside sounds which originate within an organism." "It is about the size of a large watch, and consists of a metallic box with two vibrating plates, by means of which the instrument is placed upon the body to be examined. Two gum

tubes serve as conductors of the sound from the body to the ears." Its practical application is intended to serve for transcultation of the internal parts of the body, by pressing it down a little and by gentle rubbing with the index finger about the point to be examined—instead of percussion, which is too strong for this instrument. It is evidently more delicate and its scope much more extensive than the stethoscope, which it should supplant.

SMITHSONIAN INSTITUTION.—Annual report of the Board of Regents, showing the operations, expenditures, and condition of the Institution to July, 1896. Washington: Government Print. 8vo. Pp. 779. With numerous illustrations.

The reports of the proceedings, executive committee, and of the secretary of the respective details, showing the continued excellent management and progress of the Institution, take up the first one hundred and twenty-two pages; the General Appendix the remainder, comprehending twenty-five special investigations of and reports upon scientific subjects, and memorials of Dr. Joseph M. Toner, William Bower Taylor, Joseph Prestwich, and John Adams Ryder. Of the twenty scientific papers, "Recent Advances in Science and their Bearing on Medicine and Surgery," by Michael Foster; "Leading and Modern Physiology," by J. Burdon-Sanderson; "The Processes of Life Revealed by the Microscope—a Plea for Physiological Histology," by Simon Henry Gage; and "The War With the Microbes," by E. A. de Schweinitz, are of practical interest to physicians and sanitarians; and the rest, to all scientists. The volume altogether is a substantial contribution to the purpose of the Institution.

A REVIEWER of "Phases of My Life," in "Literature," published by Harper & Brothers, quotes the following story of a seaman of the old school: "From time to time I met at dinner a great friend of Lord Gage's, Admiral Boyle. Invariably when we met, this admiral of the old school, who, among other things, hated ironclads, would come to me and say: 'Do you, sir, read the account of St. Paul's shipwreck?' 'Yes, it is the appointed lesson.' 'Well, all I can say, as an old sailor, is that if any captain in her majesty's service handled his vessel as the captain of that ship did, he would have been court-martialed next day and dismissed the service."

A REPORT is current that Messrs. Harper & Brothers, the publishers of "Harper's Weekly," are about to issue a beautifully printed Pictorial History of the War with Spain. The report

says that no expense or effort is being spared by the publishers to make this history the most accurate and authentic account of the war, as well as the handsomest souvenir of it, that can be produced. Many of the magnificent illustrations which have appeared from week to week in "Harper's Weekly" during the summer will be included, while the literary portion will be contributed by the distinguished war correspondents of the house of Harper, and by many of the officers who took part in the war.

CONTEMPORARY LITERATURE.

LIFE AND HEALTH.

Physical endurance is often regarded as the great end and aim of all, but physical endurance is only the result of mental action. The training of the body shows the exercise of the brain in every act. Will, judgment, thought, are the moving forces of all these special acts. It is the discipline of these that measures the powers of endurance. Everyone is familiar with the fact that if a muscle or a member is not exercised the result is a withering away of the muscle or the part. The nervous mechanism which controls the nutrition of the parts are not called into action, and the instruments of the mind, owing to disuse, become rusty and incapable of performing their part. The very place in the order of existence is only maintained by the training which cultivates endurance. Species of animals have become extinct owing to the fact that they had not the endurance to meet changed conditions. Powerful nations have been overcome, and have given place to others, because they were not equal to the strife and hardships which overwhelmed them in the encounter with those who disputed their lands and possessions with them. The training of the mind to overcome obstacles enabled the white man to make a conquest of America. A mere handful of Spanish adventurers, under the guidance and unyielding determination of Pizarro, overcame the innumerable tribes of the Incas. The power of the will over the body drives it to deeds that ring through the centuries. The Spartans with this spirit, a small band, held in check the mighty hosts of the advancing Persians under Xerxes for days, and sold their lives at the cost of twenty thousand of the enemy.

Such was the result of the cultivation of powers of endurance and self-restraint. The Sybarites were defeated and wiped from the face of the earth, although they encountered the enemy with a force numbering three to one. "In times of peace prepare for war," runs the proverb. It is the greatest mistake to let the powers of endurance decline or be lost through inertness, indulgence, or indolence. No one can tell when the hour will come when the possession of this quality will be needed to not only maintain a foothold, but to preserve life itself.—"Harper's Bazar."

TENACITY OF LIFE IN THE JEW.

It far exceeds, especially in the United States, that of any other known people. This we may illustrate by the following example: Suppose two groups of one hundred infants each, one Jewish, one of average American parentage (Massachusetts), to be born on the same day. In spite of all the disparity of social conditions in favor of the latter, the chances, determined by statistical means, are that one-half of the Americans will die within forty-seven years; while the first half of the Jews will not succumb to disease or accident before the expiration of seventy-one years. The death rate is really but little over half that of the average American population. This holds good in infancy as in middle age. Lombroso has put it in another way. Of one thousand Jews born, two hundred and seventeen die before the age of seven years; while four hundred and fifty-three Christians—more than twice as many—are likely to die within the same period. This remarkable tenacity of life is well illustrated by a most suggestive article by Hoffmann.—From "The Jews, a Sociological Study," by Prof. William Z. Ripley, in "Appletons' Popular Science Monthly" for December.

COLONEL WARING'S WORK IN CUBA.

It was certainly fitting on many accounts that Colonel Waring should have been chosen to recommend the plans for Havana's sanitation. He had been greatly concerned in years past with the sewerage systems and sanitary arrangements for our own Southern cities, and had thus been conspicuously identified with the work of American defence against the periodic invasions of West Indian yellow fever. He had constructed the drainage system of Memphis, Tenn., after the great yellow fever scourge of 1878; he had also been a consulting engineer in the work of protecting New Orleans by means of sanitary appliances. Various

other Southern towns and cities had employed his services or adopted his system. All these experiences had eminently fitted him to draw up the sanitary plan of campaign for a final assault on the great stronghold of the yellow fever scourge—Havana itself. He had abundant help in his October mission, and lost no time in prosecuting his inquiries and formulating his conclusions. The subject had been much considered by others and there was a good deal of data at hand. Colonel Waring did not even wait until his arrival at New York to put his recommendations upon paper. He had intended, it is true, to revise and expand his report, but the substance of it was already prepared for presentation to President McKinley when Colonel Waring reached New York on Tuesday, October 25.

He had intended to give the document its finishing touches and carry it to Washington on Wednesday, but he found himself indisposed and consented to remain at home a day or two before going to the capital. He died on the following Saturday morning. His report survives him and will unquestionably command great deference at Washington. The drainage improvements recommended by Colonel Waring for the port of Havana will cost several millions of dollars, and will be worth in the course of the next few decades several hundred millions in the protection they will afford to the United States, not to mention the protection to Cuba itself.—From sketch of Col. George E. Waring, Jr., by Albert Shaw, in the "American Monthly Review of Reviews" for December.

WHAT ONE SEES AT BETHLEHEM.

J. James Tissot, the great French artist, who has made the remarkable illustrations for the "Life of Christ," writes of "Christmas at Bethlehem," in the December "Century." M. Tissot says:

"The town of Bethlehem is shaped in the form of a crescent, descending, terrace by terrace, the side of the hill on which it is built. On one of these terraces are grouped the massive buildings of the Latin and Greek convents, between which stands the basilica, charming the eye by the peculiar grace of its lines. All the houses are distinctly Jewish in appearance, with flat roofs capped by cupolas, and many of them have pointed archways which offer pleasant places for repose in hours of sun or shade.

"This creeping of the houses down into the very gardens of the valley heightens wonderfully the beauty of the landscape; while in the background, toward the Dead Sea, the mountains of Moab

tower majestically above the gentle undulations of hill and vale. Every feature of this never-to-be-forgotten scene is full of sacred significance. In front of the city you are shown the field where Ruth and Boaz met, and near by is the spot where the shepherds were told of our Savior's birth. At a point still nearer the crescent-shaped city is the well from which David so desired to drink after doing battle. A little farther on, and quite by itself, is the tomb of Rachel, beyond which are other battle-fields mentioned in the Bible."

THE DECEMBER NORTH AMERICAN REVIEW is emphatically a number devoted to an authoritative consideration of some of the most vital topics of the day. Its opening pages present an effective and important symposium on "The Reorganization of the Naval Personnel," contributed to by the Hon. Francis H. Wilson, formerly member of the Naval Committee of the House of Representatives; the Hon. Theodore Roosevelt, late Assistant Secretary of the Navy; Commodore John W. Philip, U. S. N.; Commodore George W. Melville, Engineer-in-Chief U. S. N., and the Hon. George Edmund Foss, Chairman of the Sub-Committee on Personnel of the House Naval Committee. Dr. Alvah H. Doty, Health Officer of the Port of New York, writes interestingly of "The Scientific Prevention of Yellow Fever," and Max O'Rell furnishes the first installment of an article on "Studies in Cheerfulness." Corry M. Stadden treats of the "Latest Aspects of the Nicaragua Canal Project," while the Hon. Thomas L. James, President of the Lincoln National Bank, New York, discusses the question "Do National Bank Examiners Examine?" The Rev. Dr. Lyman Abbott deals suggestively with "Our Indian Problem," and "The Atlantic Fisheries Question" forms the theme of an important paper from the pen of P. T. McGrath, of St. John's, Newfoundland. A timely article entitled "The Fashoda Incident" is contributed by Lieutenant Winston Spencer-Churchill, and the Hon. Hannis Taylor, late United States Minister to Spain, presents a most important paper on "The Work of the Peace Commission." Other topics dealt with are: "The Decision Against Railway Pooling," by Roswell Miller, President of the Chicago, Milwaukee & St. Paul Railway; "Financial Wrong in Porto Rico," by Lieutenant Clarence Wiener, and "Concerning Ethics and Etiquette," by Geraldine Myrick.

THE CHRISTMAS NUMBER OF THE CENTURY appears in a strik-

ing cover, designed by Tissot, the famous French artist who illustrated the "Life of Christ." The design represents the visit of the Magi to the Christ-child, and was printed in colors in Paris. The particularly striking features are: Lieutenant Richmond Pearson Hobson's personal story of "The Sinking of the Merrimac." It tells of "The Scheme and the Preparations" for the blocking of Santiago harbor by the blowing up of the collier. It is illustrated with portraits, drawings, photographs, maps, plans, etc. This is the first complete and authoritative story of the manœuvre, and Lieutenant Hobson will write for no other periodical. The second paper, giving Captain Charles D. Sigsbee's "Personal Narrative of the Maine," is devoted to "The Explosion." Captain Sigsbee describes his own experiences at the time of the wreck, and states his conviction that the Maine was blown up by an explosion from the outside. Professor Wheeler's life of Alexander the Great takes up the young Macedonian's brilliant campaign subduing the rebellion that followed the assassination of Philip. Among the many illustrations are pictures by Loeb and Castaigne. Paul Leicester Ford tells of "Franklin's Physique, Illnesses, and Medical Theories." The concluding part of Frank R. Stockton's characteristic story, "The Vizier of the Two-Horned Alexander," is even more surprising than the beginning.

THE CHRISTMAS NUMBER OF HARPER'S MAGAZINE presents a holiday appearance in its cover of green and gold, and the illusion is not dispelled by an examination of the contents, beginning with a frontispiece in color. This frontispiece is one of the eleven illustrations that Howard Pyle has made for the opening story, "Old Captain," by Myles Hemenway. Other important features are "The Rescue of the Winslow," by Lieutenant Ernest E. Mead, U. S. R. C. S., illustrated from drawings by H. Reuterdahl and from photographs; "The Coming Fusion of East and West," by Ernest F. Fenollosa; "How the Other Half Laughs," by John Corbin, illustrated by Lucius Hitchcock and Henry McCarter; "The White Forest," written and illustrated by Frederic Remington; and "The Martyrs' Idyl," a poem by Louise Imogen Guiney, illustrated by E. Grasset.

NOTE FROM THE CENTURY CO.

The December "Century" is out of print, except for such copies as are now on the dealers' counters. No more can be supplied, as the colored covers were printed in France and a new edition cannot be had in time to be available.

THE SANITARIAN.

FEBRUARY, 1899.

NUMBER 351.

MUNICIPAL AUTHORITIES AND PUBLIC SLAUGHTER-HOUSES.*

THE PREVENTION OF UNWHOLESOME MEAT.

By MR. E. PARKES, M. P., Chairman of the Markets and Fairs Committee of the Birmingham Corporation.

The importance of the question to municipalities of the establishment of public slaughter-houses is not appreciated as it should be in this country, and it is only recently that we are giving that consideration to the subject which it deserves. Other countries, especially Germany, have gone a long way ahead of us, and it behooves those who have the health of the public largely in their hands to pay increased attention, not only to the sanitary question as to how a private slaughter-house affects the health of the inhabitants of the neighborhood in which it is located, but to the securing of a large and wholesome food supply for the people, and to insure that animals are prepared for food under sanitary conditions and with efficient supervision by meat inspectors. We are slow to move in this country, but, having once grasped the importance of the subject, I hope I shall make up for lost time. It is a large question, and it is impossible for me to go into much detail with the time at my disposal.

There are four main divisions to consider: (1) The establishment of public slaughter-houses or halls, with all modern appliances, and with the sanitary arrangements as perfect as possible; (2) the efficient inspection of meat by qualified persons; (3) proper facilities for keeping dead meat; and (4) mode of killing.

* A paper read at the Birmingham Congress of the Sanitary Institute September, 1898.

On the first point there is no doubt that the existence of so many private slaughter-houses, often in a very unsanitary condition and placed in the midst of a dense population, is one of the greatest drawbacks we have in England in dealing with the whole subject. Our Parliamentary powers are insufficient to deal with them. In the case of new communities and new areas in this country no doubt it can be and is being dealt with, but in our large towns vested interests are so sacred, and the number of registered and licensed slaughter-houses so numerous, that it presents an almost impassable barrier to those who desire to see things altered for the better. In Germany, again, it is quite different. There the public powers are amply sufficient to deal with any nuisance arising from private slaughter-houses. It is no uncommon thing to find in the large towns that powers are exercised in abolishing the private slaughter-house, and erecting in their place in a suitable position outside the town, with good railway accommodation, fine new establishments, comprising market-halls for cattle, sheep and pigs, slaughter-halls, refrigerators, laboratories, destructors, refreshment-rooms, offices, and all appliances necessary for a complete market.

THE LAW IN GERMANY.

In Germany the town council where the General Slaughtering Act has been applied by means of a local Act has power to erect and carry on public slaughter-houses. The town council may issue an order prohibiting the slaughtering of animals anywhere within the limits of their district, except at the public slaughter-houses. The prohibition may also be applied to the carrying on of all trades intimately connected with the slaughter of animals for food. The council may prohibit a further use of private or other slaughter-houses, except those erected or carried on by an association or guild of butchers.

The council may, after they have erected public slaughter-houses, make regulations for the examination by experts, both before and after slaughter, of all animals brought to the public slaughter-houses, in order that the condition of such animals may be ascertained; and for the examination of all fresh meat not slaughtered in the public slaughter-houses, by duly appointed experts, before it is offered to the public for sale. A fee shall be payable by the owner of the meat to the council for such inspection. They may enact that fresh meat brought from outside the

area of the town, and disposed of to restaurants, hotels, etc., shall not be prepared for food until it has been inspected. They may altogether prohibit the importation of prepared meats, and decide that in public markets, shops, etc., the flesh of animals which have not been slaughtered in the public slaughter-houses shall be kept and exposed for sale separate from that which has been so slaughtered. They may order that no meat shall be sold in any public market-hall which has not been slaughtered, etc., at the public slaughter-house; and that butchers shall not offer meat for sale which has been slaughtered outside the area and within a prohibited district or radius.

The council may make and publish regulations as to the examination of meat, and fix the fees to be taken for such examination. Regulations as to the inspection of meat not slaughtered in the public slaughter-houses shall direct that all meat shall be submitted to the inspector—in the case of large animals in sides or quarters, and in the case of small animals in whole carcasses. The fees to be charged for the inspection of meat shall not in the aggregate exceed the cost of such inspection. Various lines and restrictions are laid down as to how and under what circumstances these regulations are to be carried into effect. The regulations of a local authority require the approval of the Provincial Government. The town council may close all private slaughter-houses after giving six months' notice of their intention so to do. It is within their discretion to allow a longer period to elapse. After the issue of such notice it is illegal to erect any new private slaughter-houses.

Compensation shall be paid by the council to the proprietors and tenants of the private slaughter-houses which are closed in pursuance of the council's orders, such compensation being for real damage or loss which can be proved by the aforementioned persons on account of the closing of their places, such places having been built for slaughtering purposes. In calculating the compensation to be paid the amount which may be realized from the properties and fixtures when used for other purposes shall be deducted. No compensation shall be paid for the extra trouble there may be involved by reason of a butcher having to slaughter away from his own place of business. Where the premises to be closed are held by the occupier on a lease, such lease shall terminate at the same time as the notice issued by the council. No claim shall stand as between landlord and tenant on account of such termina-

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tion of a lease. It is necessary for the owners and tenants of premises to be closed to give notice to the Provincial Government of their intention to claim compensation within six months, or their claims will not be allowed. This Government appoints an arbitrator, who, with the assistance of two others—one to be appointed by the claimant and one by the town council—shall inquire into the claim that has been made. The above is a short description of German law on the question of inspection and private slaughter-houses.

ENGLISH REQUIREMENTS.

The Royal Commission on Tuberculosis, in their report to our Parliament this year, recommend: (*a*) When the local authority in any town or urban district in England, Wales and Ireland have provided a public slaughter-house, powers be conferred on them to declare that no other place within the town or borough shall be used for slaughtering, except that a period of three years be allowed to owners of existing private slaughter-houses to apply their premises to other purposes. (*b*) That local authorities be empowered to refuse all meat slaughtered elsewhere than in a public slaughter-house and brought into the district for sale to be taken to a place where such meat may be inspected, and that the authorities be empowered to make a charge to cover the costs of such inspection. (*c*) Inspectors shall be engaged and shall stamp the joints of all carcasses passed as sound. (*d*) The commission further recommends that it shall not be lawful to offer for sale the meat of any animal which has not been killed in a duly-licensed slaughter-house.

These are drastic recommendations, but it is what other countries have had to do, and we shall be compelled to do likewise if we are to deal effectively with the question. It is worthy of the notice of other municipalities that the Public Health Committee of the London County Council are recommending the council to inform the Local Government Board that they are prepared to carry out the recommendations of the commission if the power be given to them by Parliament. In Germany, on the closing of private slaughter-houses, compensation is paid to the owner and tenant, a definite procedure for ascertaining the amount being laid down by Act of Parliament. In Leipzig the prohibition of all private slaughter-houses and the provision that all slaughtering shall be done only in the public slaughter-houses is very stringent.

EFFICIENT INSPECTION.

Equally important with having a suitable public slaughter-house is the question of efficient inspection of meat. This is conducted in a most scientific manner in Germany, and from all we learned is most successful. So thorough especially is the microscopical examination of pork, that one of the members of our deputation which visited Germany was led to remark: "Well, after seeing the way they examine pork in Germany, I should have no hesitation in eating German sausages." In England there is no compulsion to have meat inspected at all. It is left to the conscience of the butcher, if he has any doubt about the quality, to call in the inspector, or to the perseverance and sharp eyes of that official to discover cases of inferior meat offered for public sale. In Germany it is compulsory that all meat should be inspected and stamped before it is used for the food of man. Our inspectors may be very vigilant, but in consequence of the large number of private slaughter-houses it is impossible for them to visit them all when the process of killing is going on.

The question of stamping meat has recently come up for discussion in this country, and there seems a great amount of prejudice against it, but in Germany it is exactly the reverse. Many stamps are placed on each carcass, and these stamps are a guarantee of soundness, and without them people there would hesitate to purchase. In Leipzig all cattle brought into the market are examined by experts. The staff consists of a director, who is the supreme officer, and acts, with the consent of the Minister of the Interior, as official veterinary inspector for contagious diseases in cattle for a given area and is responsible for all inspection. Besides the director there are the two veterinary surgeons, two assistant veterinary surgeons, the chief of the microscopical department and microscopical assistants, and the officers engaged in taking the samples of meat. The chief officers are sworn in by taking the oath, and bind themselves to truly and conscientiously execute the work of meat inspection, to carefully watch the slaughtering of all animals by slaughtermen, and to observe the ordinary by-laws. Attached to all the large markets is a staff of veterinary and microscopical inspectors. In Berlin, for instance, we were told that there were 240 persons engaged in the microscopic examination of meat, 90 of whom were women.

There is no doubt that we are very much behindhand on the question of meat inspection in England, and without attempting to

go into it as thoroughly as described above, there is a great deal that we might and ought to do to make inspection more thorough. A veterinary surgeon with a practical training is the ideal inspector, and the time is coming, no doubt, in this country when some such law will be enacted. The opinion of such men will be taken generally without any question by the butchers, but an unqualified or inexperienced man is often the cause of a great deal of friction and unpleasantness in carrying out his work. In some districts in England, especially in country districts, the system of inspection is most lax, and the inspectors have often the flimsiest qualification to perform their duties. The whole question requires to be put on a different basis, and not left, as it often now is, to men with a mere smattering of knowledge and who have been able to answer a few questions at a sanitary science examination. There should be more uniformity of practice, the recommendation of the Royal Commission being very useful in this respect, and officers of different localities should work together, so that it would not be possible, as it sometimes is now, for dealers in bad meat to be driven out of a district or town where inspection is efficient and establish themselves over the border where inspection may be very lax. The whole question of meat inspection and public and private slaughter-houses requires the immediate attention of municipalities and of the legislature, with a due consideration, not only for the public health, but also for the interests of the traders concerned.

I think it is well that I should give some idea of the magnitude of the German establishments. In Berlin, with a population of 1,700,000, the general slaughtering law was applied in 1883, and that same year the markets in that city were opened for use, at a cost of £600,000; immediately after that date all private slaughter-houses in the city were closed. The cattle markets and slaughter-houses are in the outskirts of the city, and cover an area of 90 acres, 28 acres of which are reserved for railway sidings, including land for their extension. The cattle market-hall is a huge building, 240 yards by 80 yards wide, or about 4 acres in area. The population of Hanover is 126,000. The markets cost £140,000, and are situated about one and a half miles from the centre of the city, the area of site being about 17 acres. The population of Leipzig is 330,000. The cattle markets and slaughter-houses are nearly two miles from the centre of the city. The area, 29 acres. A main line of railway runs at the side of the markets, and tramways

also into them. The total cost, including land and railway siding, was £235,000. These markets were erected in 1888, and are among the most complete of any in Germany. The population of Spandau is 35,000. The area of the markets was nearly 4 acres. The cost of building was £40,000.

The markets in Germany generally include market-halls for live cattle, sheep and pigs; slaughter-halls for the different animals, including one for horse-slaughtering; cold storage; bad meat destructors; ice-making plant; rooms for tripe-dressing; fat and tallow departments; and last, but not least, the inspection department. We generally noticed the scrupulous cleanliness and order which prevailed in these establishments, and everywhere they were laid out on a large scale, with plenty of room for each department. This is only possible where land is taken outside the city, and from what we saw it is certainly the best way of dealing with the problem; but in Germany they have Parliamentary powers to enable them to carry out their ideal, and they seem to have unlimited money to spend in the building of their markets. In Germany the whole question has been grasped boldly, thoroughly and successfully.

On the question of killing I do not know that it is necessary I should say much. We found that generally in Germany the pole-axe was used, as with us; in the case of beasts a mask was sometimes put over the face of the animal. In the slaughter of pigs a small cylinder, inclosing a pin and controlled by a spring, was used, a large wooden mallet being used to strike the pin when placed on the animal's head, which is really a spring pole-axe. We have tried several new methods of slaughtering animals, but generally there are drawbacks to the use of each of them, and in the hands of a duly-qualified slaughterman the pole-axe is as sure and expeditious as any other method.

THE BIRMINGHAM BUILDINGS.

In Birmingham a few years ago we were confronted with the problem of building new market-halls, slaughter-houses, etc., and after visiting many Continental and English markets, and giving the matter a great deal of thought, we decided upon the erection of the present building, which has now been opened about nine months. It is not exactly ideal, inasmuch as it is placed in the centre of the town, but we had no alternative, the land having been purchased some years ago.

We had about 12,000 yards of land to deal with, and our business was to make the best use of it. On the ground floor we have placed the large meat market, twenty separate slaughter-houses for wholesale butchers, the slaughter-halls, the offices, the fat stores, etc. On the upper floor we have placed the lairage for cattle and sheep, and the tripe-dressing, blood and gut-cleaning departments. In the basement we have the cold storage, the engines for electric lighting and for cold storage, etc., and steam boilers. The main hall is 365 feet long, by 95 feet wide by 65 feet high to centre of roof. Over the stalls, in the centre of market, are thirty-four offices, approached by two staircases, for the use of the salesmen. We have two hydraulic lifts connecting the market-hall with the cold stores below; the meat market-hall is fitted to hang about 3,000 sides of beef. We have a complete system of overhead traveling-gear connecting the slaughter-houses and halls with general market and cold stores.

We have a very complete electric lighting system, the motive power being supplied by four large gas engines of 85 break horse-power each, running 200 revolutions per minute. Hot water and steam is conveyed to the different departments all over the site, there being hot and cold water taps in all the slaughter-house departments. We have a tripery fitted with all necessary appliances, rooms for fat and hides, ropes, blood, etc. We have also, in addition to separate slaughter-houses, a slaughter-hall for beasts, sheep and calves, 250 feet long by 40 feet broad. In Germany, as already explained, the system is to slaughter in open halls. They like it best for many reasons, and perhaps it is the best system on the whole. We could not very well adopt this system in its entirety—there was some feeling against it by the trade—but have adopted the two systems; but ere long I expect that the slaughter-halls will be extensively used. The pig slaughter-hall is 96 feet by 40 feet, and is fitted with six scalding-tubs.

The cold stores and chill-rooms have been constructed by the Linde Refrigeration Company, who have leased a portion of basement from the corporation, and have constructed rooms which will store about 25,000 carcasses of mutton and 300 sides of beef. Accommodation is being provided for the slaughtermen in the shape of a mess-room, another room being allotted for the salesmen. The Birmingham Coffee House Company have a shop on the premises. A water tower is erected on the Bradford Street end of the site, in which is placed two large tanks, one of which con-

tains a reserve of water (about 20,000 gallons) in case of a temporary shutting-off of the mains. The action of the corporation in erecting these premises has been fully justified, seeing that, although the area of the meat market-hall is six times that of the old market, nearly every stall is let. Nineteen out of the twenty separate slaughter-houses are let, and killing is now being carried on in the slaughter-halls. The total cost of the scheme, including the site, which was an expensive one, will be about £120,000.

Birmingham justly feels that in regard to its meat market and public slaughter-houses we have premises which are constructed on the most modern principles, due regard having been observed to a good hot and cold water supply, efficient lighting and ventilation, drainage arranged to prevent the escape of solids into the sewers, the manure, etc., being carted right out onto farms. The premises are capable of being properly cleansed, and it has been our endeavor to insure that the surroundings of the fresh-killed meat shall be pure and clean, and that as little handling of the meat as possible shall take place. Although our new market-hall is six times the area of the old one, we find it none too large, nearly every stall at the present time being let. Since the premises have been erected many other municipalities who are moving in this matter have sent deputations to inspect the premises and arrangements here, and the Markets and Fairs Committee will be pleased at all times to arrange for such inspections and to give any useful information which they can on the matter.

WHAT THE VERY POOR EAT.

DIETARIES OF SLUMS IN AMERICAN CITIES STUDIED.

(Special Correspondence of the Boston "Transcript.")

WASHINGTON, Dec. 16.

Experts of the Department of Agriculture have been making a special study of the foods eaten by foreign-born people in American cities. Their attention has been devoted chiefly to the very poor, because with them the problem of food supply is one of acute and even overwhelming importance. The well-to-do citizen regards the supplies for his table as a mere incidental, the bulk of his income being expended in other ways, and largely for luxuries. But with the poor it is quite otherwise; mere maintenance for their

bodies is the chief anxiety, and absorbs the bulk of the money product of the family.

The experts made their studies in districts of various cities where people of many nationalities have their homes. As might be imagined, they encountered many difficulties. Not a few of these aliens, settled on American soil, were suspicious of the motives of the persons who desired to subject them to a quasi-microscopic observation in regard to their eating and drinking. Naturally they could not understand it, and imagined that the agents of the Department of Agriculture were spies set to watch their private affairs. In several instances it was necessary to pay them for the privileges of permitting the dietary studies to be made.

Now, the method of the dietary study is simple enough. When a family is under this kind of observation, two visits are made to it daily, and on each occasion all food materials bought since the previous call are carefully weighed. The family is instructed to weigh portions of flour and sugar, if considerable quantities of these are on hand, and to use only from the weighed portions. Of course there are chances of error. Things run out just before mealtime, and the smallest girl is despatched with orders to purchase five cents' worth of tea, three cents' worth of crackers, or what not. But in most instances pretty definite data were secured.

The experts had their own figures as to the per cent. of muscle-forming substance in a pound of beans, and as to how much fuel a pound of eggs would furnish; the same, too, with all sorts of every-day foods. But they came across quite a number of articles entering into the dietaries of the foreign-born people which were new to them, and of these they were obliged to make special analyses. Also they came across various inferior articles in common use, such as low-grade and cheap flour, which did not correspond in food value to the high-grade articles, and here again special analyses were requisite. In none of the studies was it found practicable to make an accurate reckoning of the kitchen waste.

The method adopted for reckoning the food values of various articles purchased in the markets was very pretty and simple. A turnip, for example, of a given weight contains a certain amount of substance that goes to make muscle and blood. Also, it contains a certain quantity of another kind of substance which furnishes fuel for running the body machine. A human being re-

quires fuel as much as a locomotive does, else he would run down and come to a stop. Fat is a fuel; sugar and starch are fuels. You eat half a pound of sugar and it contributes nothing to make muscle and blood in your body, but to your body it is just what coal is to the locomotive. It is the same way with starch or with the fat of meats. If you want blood and muscle you must eat the foods which supply that sort of material, such as lean meat or peas and beans. Most foods contain both fuel-stuff and muscle-stuff, but the proportions vary. Accordingly, it is of the utmost importance to know how much of each is contained in each kind of food.

Extraordinary difficulty was encountered in obtaining the consent of Italians for dietary studies in their homes. They did not see why the Government should wish to inquire as to their private domestic arrangements; to weigh the flour and meat which they ate, and to write a report on the subject. There must be something unpleasant behind it, and, anyway, it was impertinent. Nevertheless the essential facts were secured by careful investigation. It appears that the chief articles of food of the Italians in American cities are wheat flour (or bread) macaroni and noodles. Potatoes, beans and peas also furnish an economical source of nutriment. People of this nationality, after acquiring residence in this country, cling to their native dietary habits with extraordinary persistence. They consume a great deal of macaroni, which, fortunately for them, is made in the United States. The same is not the case, however, with Italian oil, wine and cheese, which even the poorest families utilize daily, though they have to be imported and are proportionately expensive. Such articles are comparatively cheap in Italy, and so this transplanted population has become accustomed to their use.

One of the most interesting branches of the investigation described had relation to the Russian Jews. It appears that these Jews—at all events those of them who are orthodox—are extremely careful to adapt their diet to the requirements of ecclesiastical law, and the preparation of their food is equally governed by religious considerations. Of course the Jews in general have their rules about these matters, which are apt to be carefully observed, but among them there are no people more strict in this regard than the Russians. So far as vegetables and fruits are concerned, there is no prohibition against anything, but when it comes to meats very

elaborate regulations must be observed. The animals must be slaughtered in a particular manner, all of the blood being removed from the body by severing arteries in the neck. In order to get rid of the last of the blood the meat is usually soaked in water for several hours after being bought, some of the nutritious constituents being thereby lost.

The orthodox Jews buy their chickens alive and kill and dress them according to their own customs. They seem to eat comparatively little fat. In general, among the families studied, the orthodox Jews were in better health than the unorthodox Jews, who are restricted by no religious rules to a prescribed manner of living. In most of the Jewish families studied the condition of the rooms was, to say the least, untidy; potato parings, bones and all other food refuse were thrown upon the floor and swept up once a day. Such families always clean the house thoroughly once a year—i. e., at the time of the Passover. A less thorough cleaning is usual whenever a birthday in the family is celebrated.

There is no question of the fact that even the poorest people, though they waste very much less than the well-to-do, actually throw away a great deal that might be saved, simply because of ignorance of a few matters easily understood. It cannot be expected of them that they should know what per cent. of a pound of beefsteak goes to make blood and muscle, and how much of it is fuel for the running of the body machine. They go to the market, and they buy what seems most palatable at the smallest price. This is very well as far as it goes, but some of the most palatable articles of diet—as fruits, for example—are the least sustaining. Even this remark, however, is not to be made without reservation, inasmuch as fruits are desirable for health, and a few of them, like the banana, are very nutritious indeed.

The experts have a curious way of reckoning the fuel power in a pound of food. They estimate it in terms of "calories." This is simple enough, when it is understood, inasmuch as a calory represents a certain amount of "go" for the machine, like a turn of the driving-wheel of a locomotive. So, when it is said that a man requires about 3,000 calories to run him for twenty-four hours, it is easily comprehended what is meant. The trouble with many people, and particularly very poor people, is that they select foods which contain too little fuel-stuff in proportion to the muscle-forming substance, or vice-versa.

A special study was made of Bohemian families. It was ascertained that these families purchased their food at Bohemian markets, but that the character of the supplies was not peculiar. It is a custom at Bohemian markets, however, to give a piece of liver and a bone with each piece of beef sold—an item interesting to frugal housewives. Chopped beef and pork are common articles of food among the imported Bohemians. The butcher has a platter of chopped beef on one side of him and a platter of chopped pork on the other, and he mixes them to suit the individual customer. The milk dealers in these markets also sell skimmed milk and cream separately. Among the Bohemians the term "milk" is applied exclusively to skimmed milk. They usually buy more or less cream, which is added to the milk, the mixture being called "milk and cream." The amount of cream added depends upon the purse of the purchaser.

The dietaries of quite a number of Bohemian families were accurately studied, and it was found that the expenditure for food per individual averaged eleven cents a day. This result indicated a very wise and prudent expenditure for table purposes. It was found that in nearly all cases the Bohemians obtained their food at a lower cost than did the people of any other nationality studied. This was particularly noticeable in the animal foods, for which the price paid per pound was frequently not more than two-thirds that paid by other families with equal incomes.

A special investigation was made with the purpose of ascertaining the modifications in diet attributable to residence in this country. For the accomplishment of this object, families were selected which had been in the United States for different lengths of time. From the data obtained it appeared that a gradual change in diet followed removal of residence by Bohemians to the United States, and it is supposed that similar observations would apply to immigrants of other nationalities. When the Bohemians first arrive their diet naturally tends to conform itself to that to which they have been accustomed. They consume large amounts of rye flour, pork in considerable quantity, and comparatively little beef, with hardly any wheat or corn, and no variety of green vegetables and fruits worth mentioning. As they become more accustomed to the conditions existing here, they consume less pork and more beef, more wheat flour and wheat bread, and less rye flour, and a greater variety of vegetables and fruits. The second generation, native-born, adopts the American diet pure and simple.

Special attention was devoted to French Canadians, but the only notable fact deduced seems to have been that these people are remarkably fond of pie. They spend nearly as much on pastry as they do on bread—say pastry and cake, which come in the same category. Nobody can deny that pastry and cake are good foods, but at a given price they are only one-fourth as sustaining as bread. Recently there was a good deal of discussion as to the nutritive quality of wheat bread. It was asserted that the article had been greatly overestimated, and many things were much more digestible and sustaining than the so-called "staff of life." However, the fact back of all this nonsense is that bread, whether made of wheat, corn or rye, is an extremely valuable dietary substance. It is a fuel food typically, containing a great deal of starch, but, in addition, it has about twelve per cent. of the substance which makes muscle and blood. No reasonable person would suggest that a man ought to be able to live and be healthy on bread alone, but it furnishes none the less a most admirable basis of diet.

Naturally, the poor are limited in their choice of foods. It appears to be recognized by them pretty generally that wheat flour in bread, or otherwise prepared, furnishes the largest return for money expended. Strange it seems to be obliged to state that, through the practical working of domestic necessity, the poor of the great cities have arrived at conclusions not far different from those obtained by the scientific experts. In other words, they have ascertained by trial the foods from which they can get the largest amount of nourishment and the utmost of working power. The experts confess that they can hardly suggest any way in which, in certain cases, the money available could be expended more profitably for nutrients. Given a possible expenditure of $6 per week for food, there are poor families, and many of them, which get as much out of that sum in the shape of nutritive supplies as the best scientific knowledge could furnish.

In general, the experts say, the cost of a diet may be diminished by consuming less fruit, less expensive cuts of meat, and fewer vegetables than are ordinarily eaten. Fruits add comparatively little to the food value of a diet, although they are useful for other reasons. The cheaper cuts of meat are as nutritious as the more costly cuts, and may be prepared in such a way as to be very palatable. Vegetable foods are essential to a well-regulated diet. Wheat flour in the form of bread or macaroni is one of the most

nutritious, and at the same time one of the cheapest foods. Most vegetables do not contain much food material, because their bulk is largely water; but they stimulate appetite and furnish bulk.

The problem of proper sustenance of the poor in large cities is continually assuming greater proportions. In many cases the income of a family is so small that the greater part of it must be expended on the necessary food. Not infrequently, through ignorance of the nutritive value of different foods, unwise selection, and improper cooking and serving, the actual value of the food for nourishment is much less than might have been obtained for the same money expenditure. Obviously, the power of a man to do work depends upon his nutrition; a well-fed man has strength of muscle and of brain, while a poorly nourished man has not. It is a very interesting matter in this connection to mention that, according to the conclusions of the Government experts, a woman requires only four-fifths of the food of a man, the work performed by both being equal. A boy from fourteen to sixteen years old requires four-fifths the food of a man. A girl of the same age requires seven-tenths the food of a man. A child ten to thirteen years old requires six-tenths the food of a man. A child six to nine years old requires one-half the food of a man. A child three to five years old requires four-tenths the food of a man, and a child under two years old requires three-tenths the food of a man.

RENE BACHE.

INFECTION IN THE TOILET.*

By MARTIN F. ENGMAN, M. D., St. Louis, Editor "St. Louis Medical Gazette;" Secretary St. Louis Medical Society; Lecturer on Dermatology and Syphilis, Marion-Sims College of Medicine, Etc.

We will not discuss the exact meaning of the term infection, but use it in this sense to mean the introduction of disease by actual contact with the disease-producing agent, and limit the discussion to infection of or through the skin or mucous membrane. The word "toilet" used in the title of the paper refers to the care of

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the person—i. e., bathing, dressing, arranging the hair, shaving, etc.

The relation of infection to diseases of the skin has, in the last decade, become, as in all other branches of medicine, better understood; the infectious agent in several diseases has been isolated and the histo-pathology thoroughly studied. Yet the laity and the profession at large have not given the subject the thought and care that it deserves, and while immense strides are being made in sanitation and prevention of disease in general, the prevention of infection in diseases of the skin has been woefully neglected. Of course the cause of this is the comparative harmlessness to life of most of these dermatoses, they mainly causing only discomfiture or disfigurement of the person affected. Though this is so in the main, yet a number of these diseases, known to be infectious, destroy life, cause permanent disfigurement and are of sufficient importance to the community to demand a means of prevention. The object of this paper is to call attention to the lack of precaution and to make a few suggestions as to the proper care in the toilet.

Here, as elsewhere in medicine, a certain reaction of the individual is probably necessary for infection, and as is commonly taught, a "run down" or debilitated condition of the system; therefore, certain people are more susceptible than others and prevention in the restraint is not so important. Yet, do we know at a glance who is resistant? Certain diseases at certain times are more infectious than at other times; for instance, the pyodermata during the warm months are very infectious, and spread quickly through a house or neighborhood. Certain diseases are more infectious than others, as syphilis, compared to the pyodermata. But the question is not how, when or why are these diseases infectious, but what are the diseases? What proof have we of their infectious nature; the media of introduction and how prevented?

In naming the infectious diseases it is only necessary to take those which are the most common and are the better understood. Syphilis stands first, and the various locations of its initial sclerosis graphically illustrates the many ways of introduction. Buckley, in that immense compilation of facts entitled "Syphilis Insontium," has rivaled the most vivid imagination in the various modes of infection. *Pyodermata*, those diseases caused by the pus organisms, as first pointed out by Bockhart, namely: Impeti-

go contagiosa, folliculitis (especially of the beard, called barbers' itch), ecthyma, furunculosis, carbuncle and, possibly, certain forms of acne.

Trychopbyton, ringworm of body, scalp and head.

Scabies or itch.

Leprosy, which is undoubtedly infectious to a marked degree.

Tuberculosis.

Cancer, although here there still remains a great deal of doubt, yet, from the behavior of the neoplasm, with numbers of well-authenticated histories of infections, and the researches of modern bacteriologists, as the Italians, especially Sanferlice, we are much in favor of its infectious nature.

Protozoan infection of the skin as lately described by Wernecke, Rixford and Gilchrist. These, by the way, proved fatal, all of them having gained entrance to the body through the skin.

Blastomycetic dermatitis, as described by Gilchrist, and lately a case by Hessler, of Indianapolis, the nodules were first noticed while being shaved.

Certain forms of eczema are undoubtedly infectious, especially the so-called ecz. seborrhoicum of Unna. Under this can be classed, probably, also certain of the eczematous-like inflammations of the skin and some of the lichen group.

Alopceia prematura—falling of the hair, is, of course, due to numbers of causes, but in a large per cent. of cases local conditions are by far the most important element in its etiology. In my experience, both in private and clinic practice, over 90 per cent., at a rough estimate, are due to ecz. seborrhoicum of Unna or dermatitis seborrhoicum of Crocker. Under this term is included the clinical conditions which we call pityriasis capitis, alopecia pityrodes, seborrhea sicca, going on to a distinct eczematous condition. Elliott, of New York, expressed himself most concisely and pointedly on this subject in an article read before the American Dermatological Association, in 1892, and published in the "New York Medical Journal," February, 1893. Out of 234 cases of alopecia prematura, 207, or 80 per cent., were due to purely local processes on the scalp, and all of these 207 presented the clinical appearance of ecz. seborrhoicum. He furthermore believes this to be an infectious inflammatory process.

Having glanced rapidly over the most common infectious diseases of the skin we can readily understand how easy it is to con-

vey these diseases from one to another, if the skin is in a proper condition for the propagation of the infection. Through the horny layer, the oily secretion of the sebaceous and sweat glands, hairs and mechanical rubbing off of dead cells we have a natural protection, and also possibly through unknown chemical protective antibodies in the skin; but often the outlet to the glands (the follicles) gives entrance to invasion—the horny layer is vulnerable, the protective chemical gate is passed and disease springs up. We never know when we are in a condition to successfully repulse invasion, therefore it is necessary for the protection of ourselves, our patients and the community at large to know the most threatening acts of our daily life and modify them to reduce the danger.

The toilet, or the methods used for the care of the person as carelessly performed by most of us is dangerous. Of course, to keep ourselves clean is an anti-infectious act, but it is only so when performed by instruments free from infectious matter. The family wash-rag or towel is a pernicious agent. How rapidly can the pus organisms be spread from child to child in a family or school when the skin is made ready for the infection by prickly heat. Scabies, after the hand has been soaped and the horny layer softened the itch-mite or its lavæ is transferred to the towel ready for the next wiper. Pediculosis is also frequently conveyed in the same manner. The vaseline bottle, powder puff or rag, and other articles of household use in the toilet are dangerous when contaminated.

Auto-infection often occurs; a case in particular came to my notice a short while ago. This gentleman had a small pustule near the left ear. The next day after shaving a dozen or more similar pustules appeared on the left cheek, showing a direct auto-infection conveyed by the brush or razor.

Reasoning from experience, our intelligence could dictate to us various and many ways of conveying and inoculating disease germs by toilet articles, but we will hasten on and come to the particular point of the paper, namely, the danger existing in the public places devoted to the toilet—barber shops, hair-dressing establishments and other places where the articles of the toilet, combs, brushes, razors, etc., are used upon all kinds of people without proper cleansing and care. The razor is considered by some authorities to be the conveyor of the organism in diseases of the beard, as trichophytosis barbæ and sycosis. Be it the razor or

brush, how much expense and trouble would be prevented by sterilizing the implements before using. Auto-infection from a harmless-looking pimple can be prevented by using ordinary surgical care, by opening and thoroughly disinfecting before shaving. From the modern researches into the cause of alopecia prematura we know that it is an infectious process causing several clinical phenomena which we include under the term ecz. seborrhoicum, or, better still, dermatitis seborrhoica, as proposed by Crocker. No matter how, whether the term is properly used or not, or what organism is the specific cause, whether it be the morococcus of Unna or the micro-bacillus of Cabourand, we know from the clinical and pathological appearances of the disease that it is an infectious process, as was pointed out years ago by Unna, Lassar, Elliot, Sabourand, Merrill and others. The writer himself has found the morococci of Unna in the epithelium, scales and crusts of patients affected with this disease and cultivated the organism from like sources. Merrill's experiments coincide with those of Unna, he (Merrill) having isolated an organism answering to the description of the morococcus and caused a seborrheic eczema from a pure culture.

The writer has made it a practice to examine the scurf from the scalps of all cases of alopecia prematura, and has always found a morococcus-like coccus and the bottle bacillus of many writers. The number of these organisms in acute cases was always in proportion to the intensity of the process. I am inclined to believe, from my present experience, that alopecia prematura is a symbiotic effect of the two organisms—the morococcus and the bottle bacillus.

Knowing that the majority of cases of baldness are caused by an organism, we can readily realize how dangerous a brush or comb would be when used even by several members of a family, but how much more so when used on the many in a barber shop or hair-dresser's establishment. To carry out this idea, culture tubes were inoculated with the debris from a barber's brush and comb, with the result that the usual organisms found in the scalp were alive in these articles—a short, fat bacillus—staphylococci: streptococci, a very large coccus; the morococcus and bottle bacillus.

Often have I cured my cases of eczema seborrhoicum to have them relapse after a visit to the barber's. Dr. Elliott cites several

cases, in an article above referred to, of undoubted infection by barber's brushes, and of the whole family from one member. This I have observed time and time again, and always instruct my patients of the necessity of thoroughly disinfecting their brushes and combs and having a special set for their own use.

Already several European countries have taken up this question of asepsis in barber shops, and at the present time our city contains several so-called antiseptic shops, but the name, of those I have visited, is all that would indicate their claim.

Dr. Hardaway, of this city, always compels his barber to sterilize the instruments before using; he is especially particular as to the clippers and the use of an antiseptic on the neck before cutting the hair there, thereby preventing the painful pimples, furuncles and carbuncles that often occur after a hair-cut.

From the points made and the data cited we are, I think, permitted to draw the following conclusions:

1. That certain diseases of the skin are infectious.
2. From clinical observation and knowledge of their pathology we know them to be infectious.
3. The promiscuous use of toilet articles is often a means of infection, especially so in public places, hair-dressing establishments, etc.; the brush and comb in particular are dangerous.
4. Ordinary surgical care and cleanliness in the toilet is recommended, and probably a city ordinance compelling antisepsis to be used in barber shops.

2608 Locust Street.

HEALTH OF BOYS AT SCHOOL AND COLLEGE.

(From the New York "Sun.")

In this country it is the custom to send boys to college at an earlier age than in England. So the freshmen of our universities correspond generally to the boys who are in the senior forms of the big schools which prepare pupils for the great universities. Any person who goes to a football match, or any similar event which is largely attended by the undergraduates of Harvard or Yale or Princeton, will be struck by the high average in the matter of physique which marks the American college student. The

team consists of picked men. But as one looks around the stands one feels that there is a superabundance of material and that the competition for an opportunity to win honor in the athletic life of the university is growing greater year after year, simply because there is a constantly growing supply of men to pick from. We hear no complaints of any falling off in quality or quantity in this matter. The schools which send boys to our universities show as sturdy a lot of youngsters as it is possible to imagine.

In spite of the devotion of English boys to open-air sports, it appears that the condition of affairs among them is not satisfactory. The "Spectator" of London quotes an article by a physician in which attention is drawn to this subject. It says: "Of a hundred lads in a public school (classical school) between 13 and 15 years of age, thirty-nine were below the average height, fifty-three below the average weight, sixty-eight below the average in chest measurement, *sixty-three* were the subjects of deformities. * * * Only a minority, in fact, were really healthy or perfectly formed lads. It seems difficult to believe such a report, and yet it would hardly have been published except upon high authority; and there are some facts known to us all which give it a color of probability. Parents have been complaining for some time that boys are more 'delicate' than they used to be; that school life does not seem to 'suit' them perfectly; that, in London especially, they suffer in a way which suggests distrust of the conditions of their environment. They grow pale, flaccid and headachy, and instead of being ready to eat anything from a paving stone to a blanket, they are dainty, wanting in appetite, and sometimes even 'averse to food.' Of the 'deformities' mentioned, except pigeon-breast, we have not heard much, and cannot but suspect either accident or exaggeration, but that a sort of *malaise* is common among lads of the well-to-do class is the testimony of numberless mothers not usually given to depreciate anything that is their own."

One explanation of all this is suggested—that babies are now being raised who would formerly have died. Another is that the generation which is producing these boys is overstimulated intellectually and is overworked. But then how is it that girls of every class are bigger, healthier and stronger than their mothers were? It is stated that so much taller are the girls of the present period in England that the London dressmakers have altered their "stock sizes." Surely the girls ought to feel equally with their

brothers the influence of heredity! Another explanation offered is that at the English preparatory schools the boys are worked too hard intellectually, while they are allowed to take too much physical exercise. Excess in athletics and excess in education taken in combination are believed to be the cause of this "staleness." It is satisfactory to note that no complaint of this nature has been made by the parents of the young Americans.

A FEW HINTS ON THE TREATMENT OF CHILDREN.

DON'T SAY DON'T.

By Dr. Paul Carus.

If you have a child whom you want to perform a certain act on its own accord, but not at your request, you need only tell him "Do not do it," and he will be sure to do it. You may by force or by fear prevent a boy from being disobedient, but you cannot prevent him from feeling the itching in his fingers to do what is forbidden. All the various injunctions so freely given to children are so many temptations to become disobedient.

A little party of children had thrown several boxes of blocks down stairs, which would have given the nurse a good deal of trouble to pick up. They enjoyed the joke greatly, but when a waggish uncle told them that for a punishment the blocks should remain down stairs and that no one should be allowed to bring them up again, the little urchins started at once to carry every block up, and the joy of being disobedient beamed in their eyes.

Hence the lesson, Don't say "don't" to your children. Do not forbid. Do not lead them into the temptation to become disobedient; in other words, respect their liberty and allow them to act foolishly, if they prefer to do so at their own risk.

But the objection may be made: "Children must be educated, and education consists precisely in teaching them what not to do." That is quite true. But the method of teaching them what they should not do ought not to consist in interdictions.

If you do not want the baby to walk down stairs because he will hurt himself and is liable to fall, let him try, and let him by his own experience find that he runs a risk when going down. Tell

him he will fall, but do not forbid him: Don't say "don't." When approaching the stairs for the first time, watch over him so that he does not do himself serious harm, but let him experience the fear of falling, and warn him that he will hurt himself. If he disregards the warning, it is better for him to be sufficiently frightened by a fall to remember it.

If a child approaches the stove or the fire-place, warn him in the same way; tell him "hot," "hot," and if the child does not mind, let him burn himself a little. The nurse's business is simply to see to it that he does not meet with a serious accident, not to hinder him from making unpleasant but valuable experiences. You will find that children who are informed about the evil consequences of certain actions will mind the warning much better than the children who are forbidden to eat an apple for no reason whatever. That apple will appear "pleasant to the sight and good for food," more so than any other fruit that may be around.

When children want more sweetmeats, more strawberry shortcake, or more ice cream than is good for them, give them a fair warning. Tell them, "I should like to eat more of it myself, but I believe I shall ruin my stomach and be sick if I do; therefore I don't." If the children are strong enough and can stand a disordered stomach, it may be advisable to let them once or twice take more and let them find out themselves what an abused stomach means. But when a child falls sick and when its stomach revolts, the best plan is to sit by his bedside and help him pass in review all the things he has eaten on the previous day, and then to say to him without reproach: "I believe you ate too much ice cream," or whatever it may have been, "and I would not eat so much again. It is unpleasant to be sick, and it is after all the same taste whether you eat one or two dishes."

Sickness is a good teacher of self-control in eating, but parents must improve on the occasion and help the child to discover the cause of its indisposition.

You cannot educate children by punishments; you must make them, so far as possible, feel the evil results of their actions, and the insight into the causation of good and evil will exercise a better and more educational influence than the fear of the rod or the sting of bitter reproaches.

The child will be an echo of your behavior. Scolding makes him a scold, and severity renders him resentful.

THE TREATMENT OF A BAD BOY.

There is a peculiar difficulty in treating children when they become naughty. They scream, they howl, and become obstinate to all moralizing. Their bad temper becomes part of themselves, and to relent naturally appears to them a self-surrender.

What is to be done in such a case? Shall educators break the will of the child as is often proposed, or shall they yield and let him have his will? Neither seems to be practical, for, on the one hand, instead of breaking the will we ought to strengthen it, and, on the other hand, instead of yielding to his will, we ought to lead it and direct it in its tendencies. Will in itself is neither good nor bad; and strength of will is rather a virtue than a vice, but the goodness of a will depends on the aim toward which it tends.

A child's soul, accordingly should be treated as what it naturally is, a living commonwealth of various and frequently contradictory tendencies. And in doing so, it is advisable to identify those tendencies that are to be cherished and strengthened with the child's self, but to brand those which we wish to remove as foreign elements that are to be discarded. They are like the injurious offshoots of fruit trees which have to be pruned. If the naughtiness of the child be treated as something that he is possessed of, as a mental poison that he has to expel from his mental system, as demons and devils such as Jesus cast out according to the Gospel stories: educators will far more easily regain the good-will of their little rebel if they allow him to capitulate without suffering a humiliation.

Here a combination of two principles appears to be of advantage: first, the diverting of the attention of the child from the cause that produced his ill behavior, and secondly, the personifying his rudeness with a bad boy that has entered his little self. Address the child, saying: "There is a bad little boy in you, come quick, let us cast him out." And then begin a chase after the imagined bad boy; the pursuit will give joy to the child, who will soon understand the joke and with shining eyes delightedly help to expel the little devil whom he learns to consider as the cause of his bad behavior.

Afterward he will learn no longer to admit the bad boy, but to expel him before he is able to do any mischief. At any rate he will be able to distinguish between himself and the evil that might originate in him, and will thus preserve his self-esteem and there

will be no need of breaking his will in the interest of good behavior.

The methods of casting out bad boys may be changed as physicians may employ various medicines for attaining the same effect. Sometimes it is advisable to pull out the bad boy as the dentist might pull a tooth, which may be done with a corkscrew after the manner of uncorking a bottle. Another practical method which can be highly recommended is the employment of pincers. The little fellow must open his mouth for inspection, for the bad boy is supposed to sit inside, in the place whence the shrieks proceed. The opening of the mouth will of course stop further crying, and now you can give some information about the little shrieking imp inside who must be caught with the pincers. "Keep still," you tell the child, "I'll catch him with the pincers and take him out; and then you will be our good boy again!" From a quite varied experience in these experiments, I found that the method works well and the child enters into this theatrical performance of a modernized exorcism with great readiness. He accustoms himself to speak of the prior naughtiness as something foreign to his better self and will easily understand the desirability of ridding himself of bad and unworthy qualities, of anger, malevolence, envy and other passions or vices.

A similar method is applicable when children, as they frequently will do, hurt themselves and begin to cry. If the pain is not serious and will pass away as soon as their attention is called to something else, a good plan is to post them at one end of the hall, or at one corner of the table, fasten the pain with fictitious nails to the spot where they stand and then bid them run away. In speeding along the hall or running round the table they will quickly overcome their trouble. The activity of running works up an increased circulation and it will not be long before they forget their pain.

Under no circumstances does it seem advisable to pity children or to join in their complaints, even though they may be justified. Commiseration makes a child dissatisfied, and you can bring the happiest child to tears simply by pitying it for anything, however ridiculous your compassion may be.

Do not show anxiety, for thereby you make the child anxious; do not show any worry about his bad habits, for thus he will be worried himself and you weaken his character. Show a simple and straightforward determination to help the child to discard

what is undesirable in the makeup of his soul, and the child will naturally acquire a habit of ridding himself of the petty vices of childhood before they can harden into habits.

All these methods can be intensified by a review of the past in calm hours. The father and the mother must be the child's most intimate friends and counselors; they ought to tell him when they are alone with him what they themselves think of this or that naughtiness; what other people think of it; what will be the consequences; ask him how he would like the same behavior in others; and finally tell him how to mend the fault and how to avoid it in the future. There should be no scolding at such a moment, for that would disturb the calmness of the child's mind. In order to render this instruction effective, not for the moment only, but for the child's whole life, it should be a lesson of self-contemplation and a calm self-criticism.

When the child grows older, he should gradually acquire the habit of exercising this self-criticism for himself; and here it is advisable to call the child's early attention to the dangers of vanity.

STIMULATE SELF-CRITICISM.

While strength of will is a virtue, vanity is a vice. Vanity is the most dangerous demon that can take hold of us, for vanity renders self-criticism impossible.

Every child will be able to grasp the importance and paramount usefulness of self-criticism. Only tell him the story of a man who always blamed others when he did some foolish thing, and who, adhering to the belief in his own perfection, remained a fool all his lifetime. He gathered a rich store of bad experiences and came finally to the conclusion that the whole world was wrong, but the world thought all the while there was something wrong with him. On the other hand, illustrate by the examples of great men that great successes are never gained without a stern self-criticism. Self-complacency may create a very happy disposition, but this happiness will not be auspicious; it will be the happiness of lucky Hans, who joyfully exchanges his gold for a horse, his horse for a cow, his cow for a pig, his pig for a goose, his goose for a grindstone, and when the grindstone drops into a well, glories in his having so fortunately got rid of his burden. The way to success in life is the very opposite to self-complacency and is incompatible with vanity. When the foolish man complains about the wrongs of others, the wise man, whenever ill fate befalls him,

inquires first into the origin of his own mistakes. So, for instance, when he is cheated, he does not glory in his own honesty and blame the rascal who cheated him, but blames his own credulity and his lack of experience not to have seen through the schemes by which he has been caught.

Remember that the net in which most people are caught is their own vanity. La Fontaine tells the instructive fable of the raven and the fox and adds that the raven, seeing his own foolishness, vowed that he would never be caught again; but the probability is that a vain fellow would not have blamed himself; he would have scolded about the untrustworthiness of people and the frauds of foxes, but would have again fallen an easy prey to the next flatterer who approached him in the same manner.

What appears to us a misfortune is frequently the result of a bad quality in our character. Gamblers are in the habit of catching their victims by first giving them a chance to cheat; tricky agents make you believe that they sell underprice; dishonest lawyers give you a chance to make a contract in which you believe that you cheat some one else, while in fact you are being cheated.

Think of the victims of Reynard the Fox. He knows the foibles of the messengers sent to him and ensnares them in their own vices. The cat is caught by his preference for mice, the wolf by his greed, the bear by his love of honey. None of them blames himself, but all denounce the fox's villainy.

Considering the truth that our own petty vices are the greatest dangers of our life, we must early teach children to regard them as foreign elements which they should cast off, and must help our youngsters to overcome them with grace and in good humor. Genuine manliness is not possible without self-criticism and is built upon a rigorous self-discipline.

DO NOT PUNISH.

Since the days of barbarism a constant change in the treatment of punishment has been going on in civilized countries. The old method was a system of retaliation. Punishment is revenge. The new method which replaces punishment by correction may be called, briefly, a system of education. The turning point in the evolutionary curve of mankind is of a religious nature. It appears first as good-will toward all, the good and the bad alike, and in the history of the East in Buddha's teaching, it is based on the consideration that all creatures, good and evil ones, are the product of circumstances, and that therefore the bad deserve compassion, not

hatred. If a man's character is conditioned by his past, by the circumstances under which he was developed, there is no longer any sense in expecting that he should act differently from what he does according to his nature. Every creature is as its own life history, since the beginning of life on earth, has formed it; and as it is, so it will act. There is no cause for becoming excited about criminal actions. We must understand them, we must above all investigate their motives, and must treat them in the same way as a physician treats a disease. That society, or the government, or the judge, should commit a crime on the criminal because the criminal has committed a crime on society, is as ridiculous as it would be to inflict upon the stomach a stomach-ache because by its indigestion it has produced a head-ache or otherwise injured the fellow-limbs of its organism. Retaliation is a continuation of moral disease, not a cure, and what we need is a cure. Taking this ground, Buddha abolished in the realm of religion the idea of hatred and revenge by saying that hatred is not appeased by hatred. Hatred ceases by non-hatred only. And in the same spirit Christ taught in the Sermon on the Mount (Matt. v. 38-39), saying:

"Ye have heard that it hath been said, An eye for an eye, and a tooth for a tooth: But I say unto you, That ye resist not evil."

We need not discuss theology in this place, and do not care in this connection whether Christ's doctrine really was an absolute non-resistance of evil, as is maintained in this and the following sentences. We only point out the truth of the sentiment which prompted these sayings and which should be expressed in the sentence: "Resist not evil with evil." Evil must be resisted; but we must not retaliate. Instead of demanding a tooth for a tooth, and giving a lie for a lie, we must overcome a lie by truth, wrong by right, and violence by patience. This ideal of Buddhism and of Christianity has not been introduced into our law books, but is an ideal which mankind in its further progress of evolution is endeavoring to actualize. Justice during the Middle Ages was to a great extent an administration of retaliating punishments. Criminals condemned to die were usually pinched with red hot tongs, their limbs were broken on the wheel, they were burned alive, and all kinds of cruel torture were cunningly invented to make the death of the criminal as painful as possible. All this has changed. Capital punishment, above all, has ceased to be a retaliation, and has become more and more a mere protection against the repetition

of a crime. As it would be wrong to leave a tiger abroad, so a man, who by his very nature is a murderer, should not be allowed to remain at liberty, and since imprisonment is on the one hand not a sufficient guarantee for the safety of society, and on the other hand a more cruel treatment than death, capital punishment is, so far as our civilization goes, still a necessity of our penal law. Yet the attempt is no longer made to retaliate on the murderer the cruelties which he has committed. It is a maxim which has never been explicitly introduced by law, but which is nevertheless firmly established in all civilized countries, that the death punishment should be inflicted with as little pain as possible. The criminal is simply no longer allowed to live, and capital punishment has ceased to be a revenge or retaliation. It has become a cure based upon the experience that the man who commits a murder is liable to commit another murder. Hence a murderer who has killed a man not on account of his murderous inclination, but through an unhappy complication of circumstances, be it in defence of his honor, or for some other reason which is regarded as a sufficient explanation of an unusual and justifiable wrath, will not be treated as a habitual muurderer, and is, according to the laws of all civilized countries not punishable by death.

Our penal laws are not as yet fully adapted to the new view. All the minor punishments are still based upon the plan of retaliation which makes our prisons and penitentiaries breeding-places of crime instead of what they ought to be, moral hospitals. There is no question, however, that the more humane treatment of the criminal will in time be brought about. The result will as surely take place as the religious considerations of justice toward our fallen fellowmen and a scientific consideration of crime as a moral disease will in the long run change our methods in education as well as in the administration of justice.

What our courts of justice ought to be and ought to become, parents must realize on a smaller scale in the education of their children. There ought to be no punishment of children in the old and proper sense of punishment. Punishment, if we are permitted to use the old word in a more general sense, ought to become a method of education, and ought to cease inflicting pain without any ulterior purpose. Punishment ought to be nothing but the consequences of a wrong act which is brought home to the knowledge and the sentiments of the child. As a rule, parents do just the reverse. They make the children escape the evil consequences

of wrong doing, and let them feel a punishment, the reason of which must naturally appear as the expression of wrath or ill-will. If a child breaks things, it ought, if possible, be made to feel the loss of the broken thing. Suppose he has broken his own glass, then it should not be replaced at once by a new one. If it is the glass of his brother or sister, he ought to give up his own to replace the loss, and if possible some arrangement should be made to let the harm that he has caused fall, at least in part, upon himself.

There is perhaps no harm for parents to show anger if children become very mischevious, but the anger should be felt by the child to be the direct result of his action.

There is a rule propounded by educators never to punish in a state of anger, and the rule is good. But it is insufficient, in so far as the child ought to feel the anger of his parents as the result of his own deeds more than the punishment itself. It may be advisable even to simulate anger so as to impress the child's mind with the danger of losing his parents' affection. The child ought to learn what deeds are productive of wrath, and this should be made a means (one of the means only) of learning to avoid them. Otherwise, if parents would not resent mischievous acts, the child would, when later on he becomes acquainted with other people, be very much disappointed in the world, for no one else would exhibit the same patience.

The proper punishment would be to let a child feel the full result of wrong and unwise deeds. If once in a while you allow a child to eat his fill of sweets and become sick, and remind him when sick that his sickness is of his own doing, you apply a natural punishment, which without making him obstinate will cure him of a bad habit.

To educate children by simply forbidding is not the right way of securing manly independence. There ought to be as much liberty as possible, for by liberty alone the sentiment of responsibility can be insured.

DIRECT AND DIVERT, BUT DO NOT SUPPRESS.

Man is by nature a creature that yearns for activity. All his nerves and muscles are storehouses freighted with energy which are eager to perform work. The main duty of education consists in directing the work, but not in suppressing it. Every function performed establishes a case of precedence, and however easy, as

a rule, it may be to dig the first channel for the rivers of the soul, it is very difficult to change them as soon as they are firmly established in habits.

Children that are taught to busy themselves will be more manageable when they grow older than children who in their earlier years are left to themselves. The age of early babyhood, so much neglected now, is in fact the most important period of a man's whole life, and this is not less true because the evil consequences that result from mistakes made at the beginning of life are mostly difficult to trace.

The child has a right to be active and parents and nurses should see to it that when the little one is in good health it should always be busy.

Now it sometimes happens that a child does something that it should not do, that it touches things which it might break, that it begins to busy itself with things which it would better leave alone. In such cases it is not advisable to interfere violently by tearing away the thing which it should not handle. Educators will find it easy to divert the child's attention by giving it some other toy which for the sake of newness, or for some other reason, it will at once prefer.

The policy for all cases ought to be to divert the attention of a child instead of robbing it by violence of any object which it may happen to take hold of.

When things are taken away from the child, the child will naturally cry, and no one can blame the little fellow for it, but if its attention be diverted he will drop the forbidden thing voluntarily and there will be no crying and no naughtiness.

Therefore, nurses should make it a rule never to snatch away anything from a child before substituting for it some other toy which would appear at the moment preferable to the child's mind.

The same is true of bad as well as dangerous habits to which a child should be disaccustomed. Children generally love pencils and will put them into their mouths. Of course they may fall and knock the point of the pencil right into their throat. If children are forbidden to put the pencil into their mouth, they will be all the more anxious to do so and may develop a habit of doing it when unobserved, whereby an accident is almost sure to happen. But if you teach the child to take the pencil lengthwise in the mouth, he will more readily discontinue putting in the point foremost, and you will forestall in this way the formation of a dangerous habit.

What is true of children is true generally. Any one who has to deal with obstinate people, especially the warden of an asylum with insane people, will be wise never to antagonize passionate outbursts unless compelled to do so by the direct necessity. Diversion is easier than suppression.

There is a story about a warden of an insane asylum who visited one of his colleague's institutions. He was admitted to the grounds by the janitor, who knew him personally, and while walking in the park met a gentleman, who introduced himself as a doctor and inspector of the wards. The two gentlemen shook hands as colleagues and enjoyed a pleasant walk and talk, and at last the visitor was shown up to a wooden tower which commanded a general view of the park and its vicinity. When the two reached the top, the inspector at once proposed to his guest to jump down, as that was his fashion with all the people whom he showed round through the institution. Now at once the visitor, to his dismay, becomes aware of the fact that he is face to face with one of the patients, who by some mishap must have escaped from his keeper, and, as insane people frequently do, had up to that time behaved in a quite sensible way. But now the pretended inspector began to show all the symptoms of an approaching attack, and the visitor looked round for a means of defending himself in case of aggression. Had they come to a fight on the narrow platform of the tower, they would both have fallen a considerable depth. The visitor, being accustomed to insane persons, remained calm and said quietly to his companion: "You want me to jump down from this tower? That is nothing, every one can do that; but it is much more difficult to jump up from below. I'll show you how to do it; come down." The patient was startled, and asked, "Can you do that, really?" "Of course I can," was the reply; "come down and I'll show you." Thus the expert alienist diverted the wild imagination of the patient and led him down to a place in which he was no longer in danger. They had scarcely reached the ground when the keeper arrived and took charge of the fugitive.

The lesson is obvious and the policy of the clever warden can be profitably imitated in practical life, whether in dealing with irascible adults, with mobs, or with children.—From "The Monist."

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WHEELMEN AS BENEFACTORS.

There is no public institution more potent in social, political and commercial well-being than the public highway. There is nothing which, by its absence, its presence, its goodness, or its badness, may so make or mar the community which uses it or would like to use it, as the road by which its people may come together for the discussion of matters of public good or for that traffic in products which stamps man as the trading animal. Therefore the man who makes two blades of grass grow where but one grew before has his counterpart as a public benefactor in the person who puts down a good, solid, horse-saving, wagon-economizing roadbed where at first only rocks and mud or dust and sand held full sway. Roads, like people, are prone to wear into ruts, and many of the ruts in which the farmer's half-laden wagon jolts are primarily caused by the ruts into which the farmer has jolted his representative in legislative assemblages. The farmer has always wanted good roads, but he knows that the farmer has always had to pay for them, consequently he has generally looked upon any movement in their direction as a raid upon his own pocket. It required, then, some new force to join hands and voice with him both in the demand and in the suggestion of ways and means.

This new force has arrived in the bicycler. Banded under the banner of the League of American Wheelmen, the riders of the tireless tire have since their organization, in 1880, raised the cry of "good roads," and have kept it up with wondrous energy. They have not only through their engineers devised or selected the best methods of making the cheapest durable thoroughfares, but they have conquered many obstacles that have stood between them and other groups of persons who are to be benefited equally with them in securing smooth roads, though these very groups hesitated to join the wheelmen's movement for fear it was selfish and was designed to saddle the costs upon them. The horsemen who drive fine road stock and the farmers have been the two classes which have required the warmest efforts of the "good roads cranks," as some of the wheelmen are called, to wipe away suspicion. But the suspicion has now evaporated.

The Farmers' National Congress, which has just closed its session at Fort Worth, Texas, has passed strong resolutions in favor of the wheelmen's way of getting good roads. It is known as the

State aid system, and the adoption of these resolutions marks a signal success for the Highway Improvement Committee of the League of American Wheelmen, and its chairman, Otto Dorner, who never suffered anything to chill his efforts to get next to the farmers with his project. For three successive years he has attended the Farmers' Congress of some 450 delegates, representing nearly every State in the Union, and now they see his idea clearly and like it. The State aid system, as shown in the resolutions, recites that the cost of construction of first-class roads connecting farms with market towns is too considerable to be borne by farm property alone; that as the entire population is benefited directly and indirectly by good roads, all property ought to contribute through the medium of a State tax. The Higbee-Armstrong law, by which State aid has been introduced in New York, is popular. It provides for a division of the cost of road construction among the State, the county and the local township, and, it is said, many of the towns availing themselves of it will secure from outside sources four or five times the sum they raise themselves, while in the large cities, which will pay most of the funds, the tax will not fall more heavily than 1 cent per thousand dollars of the assessed valuation. It is by making such calculations that the League of American Wheelmen has fought its way to the farmers' sympathy.

It is no wonder that the farmer feared the cycler at first. The man on wheels was at first looked upon as a dude in knee breeches, out for an airing with his best girl, who demanded that others should, without cost to him, smooth the roads that he alone might have more pleasure. For years the farmer drove behind his horse with many a bumpety-bump, and the horse became stalled without ever swearing about it or writing a long protest to the county paper. The coming of the bicycle marked an epoch. Here were people who could swear and write, pushing their vehicles by main strength on wretched paths, when a street, even so rough as a Belgian block pavement makes it, permitted them to glide along almost without effort. Then the Wheelmen's League spent vast sums of money printing illustrated road books, thousands of which have been distributed free of cost, and other thousands barely at cost. In various quarters they have raised large sums to build cycle paths between sections of country, on which the cyclers pass to and fro on business and pleasure. Money has been spent by them, as in Mr. Dorner's case, to be represented at conventions and to spread what they love to call the gospel of good roads, and now

in Baltimore Chief Consul Sams, of Maryland Division, League of American Wheelmen, and Chairman Auguste Faure, of the Division Committee on Highways, are holding out the hand of friendship to the horsemen, and endeavoring to lay out a combined speedway and cycle path that shall be a local monument to the battle of good roads and serve as a model to be followed by visitors from every community who take a spin, a ride or a drive upon it. May their efforts succeed in full measure.—The Baltimore "Sun."

THE INFLUENCE OF PAVEMENTS ON PUBLIC HEALTH.*

By A. W. CAMPBELL, C. E., Provincial Road Commissioner for Ontario.

In presenting to this association a paper on the sanitary aspect of pavements, I have been actuated by a desire to obtain information, rather than to impart it. Ontario has so recently developed from a wilderness into the home of civilization and culture; our villages have grown so quickly into towns, our towns into cities, and the advance of the various sciences has been so rapid, that our people scarcely realize the changed circumstances and the need of carefully directing their energies in meeting the demands of the times. In my visits to different parts of the province I am constantly met with evidences of the good wrought by this association. I find that in very small villages even, inefficient drainage, cesspools, piggeries, slaughter-houses, and impure water supplies are not now tolerated as they were once, and that this is due to the work of your association. It is with considerable hope, therefore, that I have undertaken to briefly lay before you the subject of pavements and public health, confident that you will lend your assistance in aiding our knowledge of this as of other matters pertaining to perfect sanitation; and that where reform is needed your aid will be afforded.

There is no one paving material which possesses every quality desired in a pavement to meet all conditions and uses. The ideal pavement remains to be discovered; but the features which should belong to such an ideal pavement are so numerous and of such

* A paper read before the Association of Medical Health Officers of Ontario.

varying character as to render the search apparently a hopeless one. The ideal pavement: 1, should be cheap and economical of maintenance; 2, should be durable; 3, should suit all classes of traffic; 4, should offer little resistance to traction; 5, should give a good foot-hold to horses; 6, should be adapted to all grades; 7, should have a good appearance; 8, should not be muddy nor pervious to water; 9, should be sanitary, that is, non-absorbent, not subject to decay, easily cleaned, not dusty, not noisy.

It is apparent then that, notwithstanding the importance of the sanitary aspect of a pavement, there are other features which must be considered. The primary intention of a pavement is to accommodate travel, and to provide one which will do this satisfactorily, which will be durable, cheap, of good appearance, healthful, and possess in the highest degree the other qualities enumerated, in view of the location, nature and extent of traffic, is the problem which presents itself to the paving engineer. Just as no absolutely perfect paving for every time and place has been discovered, it is doubtful if any paving material now used should be utterly condemned. Each has its place in which, until the ideal universal pavement is found, it will be more satisfactory than any other which could be used under that particular set of circumstances of soil, climate, traffic, etc. The purpose of this paper, however, is to treat of the healthfulness of paving in general, of the sanitary aspect of commonly used paving materials; that is, asphalt, stone blocks, vitrified brick, cedar block, and broken stone (macadam), with respect to absorption, decay, ease of cleaning, dustiness and noise.

Of all these, cedar block has received the greatest censure on the score of unhealthfulness. The late Dr. O. W. Wight, Health Officer of Detroit, is quoted as saying: "On sanitary grounds I must earnestly protest against the use of wooden block pavements. Such blocks, laid endwise, not only absorb water which dissolves out the albuminoid matter that acts as a putrefactive leaven, but also absorbs an infusion of horse-manure and a great quantity of horse-urine dropped on the street. The lower end of the blocks, resting on boards, clay or sand, soon becomes covered with a fungoid growth thoroughly saturated with albuminous extract and the excreta of animals in a liquid, putrescible form. These wooden pavements undergo a decomposition in the warm season, and add to the unwholesomeness of the city. The street, in fact, might as

well be covered a foot deep with rotting barnyard manure so far as unwholesomeness is concerned. Moreover, the interstices between the blocks and the perforations of decay allow the foul liquids of the surface to flow through, supersaturating the earth beneath, and constantly adding to the putrefying mass." Cedar block has been condemned in similar terms by many others. On the other hand, Col. Heywood, Engineer of the city of London, England, has said: "It has been said that wood pavements at all times smell offensively and may be unhealthful; but although some city streets have been paved with wood for thirty years, no complaints that I am aware of have been made to the commission on this head, and the inhabitants at all times have not only expressed great anxiety lest the wood should be replaced by other materials, but have subscribed towards the cost of its renewal. * * * I have at times noticed offensive emanations from it near cab-stands, but am unable to find further evidence of its unhealthfulness. These remarks must be held to apply only to public streets open to the sun and air, and traffic; in confined places and under some conditions, wood might be objectionable. I have seen it decaying in confined places without traffic."

The one statement by the Medical Health Officer of Detroit refers directly to the cedar block pavement as we understand it in this country. The other opinion, that of Col. Heywood of London, is expressed regarding the wooden pavement as laid in European countries. Between these two pavements there is a vast difference. Under European practice, many of the pavements are of the Karri and Jarrah woods of Australia, which are thoroughly saturated with resins, are very hard and are not subject to decay. They are sawn into brick-like blocks and laid on concrete. Where soft woods are used, they are also cut into regular oblong blocks and laid on concrete, and are saturated with creosote or treated with some other preservative process. Wooden pavements of America, however, represented by cedar blocks, are of a very different order. The round blocks, of irregular diameter, are merely the untreated wood, still carrying the bark. These, placed on a bed of sand, are, under the most favorable conditions possible for decay, being constantly exposed to moisture, air and warmth. With no preservative treatment they are enabled to absorb to the fullest extent all forms of liquid street filth, which, in the process of putrefaction, feeds on the organic matter of the wood. The

surface, which quickly becomes uneven, retains a large quantity of loose matter subject to decay, the whole giving rise at times to noxious odors. The effect, were sufficient of such paving used, would subject us to the conditions favorable to marsh fever. From a sanitary standpoint, the cedar block pavement of this country would indicate a serious menace to health. At the same time, while we are justified as a matter of theory in arriving at this result, there do not appear to be any statistics to prove the conclusion to be a correct one. The death rate of cities most largely paved with cedar block does not bear any ratio to the extent of such pavement; nor does a change from cedar block to another less absorbent pavement produce a noticeable effect on the death rate.

In European practice, wood more suited to a business street than macadam, affording a better foot-hold for horses than asphalt, less noisy than granite setts, is exceedingly popular in spite of its less sanitary character. In this country, however, there is an unwillingness to renew a wooden pavement when decay has rendered it unfit for further use, and this, coupled with the less careful method of laying, is the cause of the complete disrepute into which it has fallen. Experiments have been made recently by a Polish scientist with regard to cedar block. The bacteriological examinations showed that, in specimens taken from blocks which had been in use for four years, and from a depth of one centimetre and two centimetres below the surface, there were at the end of five days 650,000, 220,000 and 12,100 bacteria per gramme of wood. A later examination showed 1,200,000 colonies per gramme in the surface of the wood, and 8,600 colonies per gramme at two centimetres below the surface. An estimate, in terms of its nitrogen, was made of the organic matter absorbed by the wood, and indicated that the surface layer of wood contains more nitrogen than the most polluted soil. A comparative estimate of the pollution of the atmosphere was made by placing a definite quantity of sulphuric acid under a glass bell, on the surface of wooden and asphalt pavements, the result, as indicated by the quantity of ammonia absorbed by the acid, being much in favor of asphalt. The observations show that while a wooden pavement gives absolute protection to the soil and to the subsoil water, there was considerable atmosphere contamination. The experiments were made on blocks of pine, preserved by impregnation with copper sulphate. Such being the case with a wooden pavement laid under European practice, there can be little doubt of the unwholesome effect of

cedar block upon the atmosphere. Further experiments of this description, conducted by members of your association, would doubtless prove instructive and profitable.

Broken stone or macadam would next arouse suspicion with regard to its absorptive qualities. There is this great difference between the two, however, that whereas a wooden pavement itself decays and affords food for the decay of other organic matter falling on it, the macadam does not in itself decay. With underdrainage such as well-built macadam roads possess, it should be little more than a good sewage disposal bed for the comparatively small amount of sewage which falls upon it. A macadam pavement can be scraped and swept, it is not noisy, dust can be subdued by sprinkling, and on sanitary grounds appears to be an excellent pavement for residential streets where traffic is not excessive. For business streets, or for heavily traveled thoroughfares of cities, a harder surface is advisable.

With regard to absorption, there can be no objection to asphalt, vitrified bricks nor stone blocks. Asphalt is impervious to water; while the joints of brick or stone pavements are practically perfect so far as absorption is concerned. To be sanitary a pavement should not be dusty. The dust of a pavement is not only an irritant, but carries with it the bacteria of disease which, from various sources, are a part of street filth. To prevent dust the pavement must be so perfectly cleaned that a practically harmless amount is taken up by the wind; or if perfect cleanliness is not possible, dust must be subdued by sprinkling. Unless perfectly cleaned, much better cleaned than is commonly the case in this country, an asphalt pavement is very apt to be a disagreeably dusty pavement on a windy day in summer. This, indeed, is one of its greatest faults from a sanitary standpoint. Toronto has the reputation of being a clean city, with a well-organized street department; yet even under these favorable conditions, a walk or drive down Yonge Street on a warm, windy day is a very trying experience. The smooth, hot surface quickly dries any matter falling upon it, a wheel passing over this dry substance grinds it to powder, and the result is that clouds of dust find their way into the eyes, nose, mouth, throat and lungs of pedestrians. Business men in their offices are not safe from its attack, as it drifts in through the open windows. The dust imbeds itself in clothing, fastens itself on articles of food exposed in the shops, to be eaten finally by the purchaser. One case came to my notice in which a consumptive patient was ordered by

his physician to leave Jarvis Street, one of the best residence streets of Toronto, because of the dust which came from the asphalted roadway. These streets are swept by machines, and are hand-swept by a corps of city employees, but are not, to my knowledge, flushed as are similar pavements in London and Paris. Flushing is the only method whereby asphalt can be freed from this unsanitary dustiness, but in addition to being expensive and hurtful to the asphalt, such a proposal will doubtless meet the disapprobation of the engineer in charge of sewers. The dust, however, is not a defect of the pavement so much as it is a fault in the method of cleaning. Asphalt has, nevertheless, the disadvantage of being a very hot pavement. Its smooth surface, reflecting back the heat and light, is productive at times of sun-stroke, and the glare is frequently painful to the eyes. This is most noticeable in closely built business sections where there is least circulation of air, where the sun beats down between high brick walls; and is not so objectionable on a shady residential street with houses well apart. Vitrified brick and stone block pavements are neither so dusty nor hot as asphalt since the surfaces are less smooth and assist in retaining in the joints the finer particles of dust. Sprinkling, too, is in a greater measure effective in subduing dust on brick or stone block than on asphalt, from the hot, smooth surface of which moisture evaporates rapidly. A macadam pavement is dusty if not properly treated, but if scraped and swept as are other pavements, the dust can be largely subdued by sprinkling. Noisiness, if excessive, is another unsanitary feature. A noisy pavement is jarring to the nerves, grating upon the sensibilities, and for either a heavily traveled business street, or a residential quarter, a quiet pavement is much to be desired. Noise itself is not always unhealthful. It is doubtful if the workman in a boiler factory, or a railroad engineer or other employee, is much influenced by the noise incidental to his occupation. Both are muscular of body, constantly taking vigorous exercise. But to the more sedentary man of business, whether at high nervous tension in his office or resting in the quiet of his home, a din, constant or intermittent, is a source of annoyance, and as such is wearing on the nervous system. The most objectionable in this regard is granite or other stone block pavement. Vitrified brick is apt, unless great precautions are taken, to create a disagreeable rumbling. Asphalt, wood and macadam are the least objectionable with respect to noise.

While we have this to say of the comparative healthfulness of different varieties of pavements, there is another condition of matters common to too many towns and cities, in which the streets in fall and spring from a wilderness of mud and stagnant pools, and in summer are shapeless beds of dust. Many of them are made the receptacles of the refuse from private property, which is left to disfigure the street, forming rivers of filth and cesspools of disease. Such streets have been regarded as a zero quantity, doing no particular harm, doing no particular good. Streets, however, which do no good, should do good, and therein lies the harm. A good street is a well-drained street, a well-cleaned street, and is a source of healthfulness to the members of the community. Streets should be the public parks, pleasing to the cultivated taste, adding to the culture and refinement of the people, and enticing them to breathe health and vigor, whether walking, bicycling, riding or driving. Passing along the city street we reach the country highway, which, as a means of permitting the people of the city to leave the congested portions and to reside in the less thickly populated suburbs, forms an important factor in securing public health.—Canadian Engineer.

GERMAN STUDIES OF MALARIAL DISEASE.*

The German Colonial Society, one of the most important of several permanent associations at Berlin which are devoted in one way or another to the systematic development of Germany's colonial possessions and the foreign trade of the Empire, has taken up with great energy the suggestions of Professor Koch as to the necessity of more effective measures for studying and mastering the malarial diseases which now so seriously restrict the settlement and impair the value of the colonies in Africa and the East, which have been acquired and maintained at such cost of effort and outlay.

It is recognized that public hygiene, among the climatic conditions which exist in tropical countries, presents difficulties for which special preparation and provision must be made. Medical officers who are sent out for service in such countries must have a special scientific training in the diagnosis, treatment and prophylaxis of malarial disease. This has now been provided for by a

* Consular Report to Department of State.

special course of study at the Institute for Infectious Diseases, of which Professor Koch is the technical chief; and a number of young physicians who are preparing for colonial service are already at work under the direction of the great bacteriologist. When their special studies are finished, these physicians will go to their posts of duty in the colonies, each provided with a special outfit of scientific apparatus devised by Professor Koch, and will be thus equipped to take up and continue the observation, record and study of malarial diseases, upon the result of which so much of the future value of Germany's tropical colonies will depend.

Besides these preparations for prolonged and systematic observation, Professor Koch has appealed to the Prussian Ministry of Medical Affairs, to which he is officially subordinate, for two further scientific expeditions, to be organized and conducted under his personal direction, for the purpose of completing thoroughly the preliminary studies which he has made in Italy, Africa and India. According to the announced plan, one of these commissions will be limited to three months and be assigned to the study of malaria in Greece and Italy, in which countries the climatic conditions are to some extent influenced by bad drainage and the unsanitary habits of the people in old and badly constructed cities.

The second expedition is to occupy two years and make an exhaustive study of malaria at the deadliest fever districts of New Guinea, East Africa and India. The keen interest manifested in this whole subject by the Prussian Ministry and Imperial Foreign Office, and the wide attention that has been attracted by Professor Koch's reports of his preliminary studies of malaria in tropical countries, encourage the belief that both the proposed expeditions will be authorized and their resepective missions carried out in accordance with Dr. Koch's specifications.

He has recently left Rome, after six weeks of study in the hospitals where are treated cases of Roman and Campagna fevers, and in which he has been aided by the foremost specialists of Italy. As a result of these studies, it is now declared that the malarial fevers of Italy are identical in cause and general character with those of East Africa, and it is believed that science is on the eve of a decisive victory over this whole group of maladies by means of liquid injections of quinine into the pulse vein. The importance of this discovery to Italy will be evident from the fact that of the sixty-nine departments into which that Kingdom is divided, only six are

absolutely free from malaria, and 1,200 square miles, including some of the most fertile districts of Italy, are, like the whole south-eastern coast of Corsica and much of Sardinia, practically uninhabitable on account of malarial disease.

Among the other interesting deductions of Professor Koch, is his freely expressed opinion that the indiscriminate use of quinine as a prophylactic in malarial countries is attended with great danger, and is in many cases the indirect cause of the pernicious "black-water" fever, one of the most virulent forms of malarial disease. The very general practice among persons coming from temperate to tropical latitudes of saturating their systems with quinine taken in regular and often excessive doses is vigorously condemned for two reasons: first, because it seriously weakens the action of the heart; and, second, because the system, having become inured to the drug, fails to respond to quinine treatment in case of actual sickness. The efficiency of the drug having been exhausted as a preventive, it has no longer any important value as a remedy; and experience shows that a person debilitated by the excessive use of quinine may take malarial fever and die of it like any one else. Professor Koch even goes so far as to assert that the increased death rate in certain portions of West Africa, where the conditions of living have been greatly improved during the past ten years, is due largely to the increased and indiscriminate use of quinine caused by its greater cheapness and the ease with which it can now be obtained. He also states that on the western coast of Africa, where all forms of malarial fevers are especially virulent, cases of the intermittent type which have resisted even heroic doses of quinine have been mastered by the use of arsenic. It is well, however, to remember in this connection that a certain antipathy to quinine and a preference for arsenic as a remedy for certain fevers is a marked and well-known peculiarity of the German school of medicine, in respect to which its opinions are in sharp disagreement with those of physicians in some other countries, notably the United States.

Another fact noticed and mentioned by Professor Koch during his studies in Africa and India is that women withstand exposure to malarial climates far better than men. During the appalling mortality on the Gold Coast within the past four years, says the report, there was hardly a death among the women living out there, while every kind of man was dying—men new to the Tropics, men born in them, men who had been accustomed to them for years,

even men who had battled with the ravages of West Africa for upwards of ten years.

The attempt to explain this anomaly by the fact that men are, as a rule, more exposed to the hot sun of day and the miasma of night, failed in presence of the fact that the death rate was highest among officials, merchants and employees who work in offices, banks and warehouses, where no exposure to weather is involved and where medical attendance, food and all conditions of living are the best obtainable in that country. The fact that black-water fever, so deadly to male Europeans, almost never attacked women, and that no physician has yet offered any reasonably conclusive explanation of such discrimination, illustrates how far medical science is yet from a full understanding of malarial disease and how long and difficult a road is yet to be traversed before the risks incurred by northern civilization in the effort to reclaim and civilize the Tropics will be reduced, through exact knowledge and scientific practice, to a minimum.

The subject is certainly so important as to invest with world-wide interest the efforts that Germany is now making under the lead of her foremost bacteriologist to reach a clear understanding of, and more potent mastery over, the scourge which now makes desert some of the fairest and most fertile portions of the earth.

FRANK H. MASON,
Consul-General.

Frankfort, October 11, 1898.

PROPOSED REGULATION OF DENTISTRY.

DR. WM. C. WOODWARD, Health Officer of the District of Columbia, and Attorney Conrad H. Syme, in behalf of the dentists, have drafted a bill to regulate the practice of dentistry in the District of Columbia. At a special meeting of the District commissioners called for the purpose, Nov. 29, Dr. Williams Donally, of the Board of Dental Examiners, explained the features of the bill to the commissioners and to a large number of dentists present at the hearing, and with one or two exceptions the measure met their approval. Dr. J. Hall Lewis, representing the Columbian Dental College, expressed his satisfaction with the proposed law, remarking that he believes it will meet the approval of the other dental schools.

Dr. Townsend objected to that provision in the bill prohibiting any one from practising dentistry except under his individual name, but Dr. Donally explained that the provision was inserted to prevent the escape of those who might attempt to evade responsibility by hiding their identity under corporation names.

Attorney Tracy L. Jeffords, who appeared on behalf of a number of dentists, suggested certain amendments which he thought necessary to perfect appeals, and at the suggestion of Commissioner Wight, promised to confer with Mr. Syme, the attorney of the District, and the United States district attorney on the matter.

PROVISIONS OF THE MEASURE.

The bill is as follows:

"A bill to regulate the practice of dentistry in the District of Columbia.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

"Section 1. That it shall be unlawful for any person not lawfully authorized to practise dentistry in the District of Columbia at the time of the passage of this act and not having in fact so practised prior to that time, to practise dentistry or to perform any operation in dentistry in said District without first having obtained and registered a license so to do, as hereinafter provided.

"Sec. 2. That there be and is hereby created a board to be known as the Board of Dental Examiners of the District of Columbia, to consist of five reputable dentists appointed by the Commissioners of said District, each resident of and for three years last past before appointment actively engaged in the practice of his profession therein; the appointments first made shall be one for one year, one for two years, one for three years, one for four years and one for five years, and thereafter each appointment shall be for a period of five years, except such as may be necessitated by death, resignation or removal, in which cases the appointment shall be for the remainder of the unexpired term. No appointee shall enter upon the discharge of his duties until he has taken oath to fairly and impartially administer the same. Said Commissioners may remove any member of said board for neglect of duty or other sufficient cause.

DUTIES AND PRIVILEGES.

"Sec. 3. That said Board of Dental Examiners shall elect such officers as may be necessary, and may elect its secretary from

others than its own members; shall have a common seal; and shall make such by-laws for the conduct of such business as may come before it, and for the conduct of such examinations as it may hold, and shall amend the same from time to time, as it may deem advisable, but no such by-laws, nor any amendment thereto, shall take effect until ten days after its approval by the Commissioners of said District. Said board shall collect from each applicant for a license to practice dentistry in the District of Columbia a fee of $10, and, from the fund thus created, shall pay such necessary expenses as it may incur; such expenses shall not exceed in any one fiscal year the amount of fees collected during that period, but if any balance remain after paying all such expenses the Commissioners of said District shall authorize the payment therefrom to the members of said board, for their services, of such amounts as said Commissioners deem proper.

"The treasurer of said board shall give said Commissioners such bond as they may require, to secure the faithful discharge of his duties. Said board shall, by means of examinations, ascertain the professional qualifications of all applicants for licenses to practice dentistry in said District, and shall issue such licenses to all who are found by such examinations to be, in the judgment of said board, competent to so practice. Such examinations shall be held in June and December of each year, and shall include all such subjects as are ordinarily included in the curriculum of dental colleges in good standing, but may be held at such other times and include such other subjects as said Commissioners authorize and direct. Said Board of Dental Examiners shall keep in books to be provided for that purpose minutes of all its meetings, a record of all applications received, and a register of all licenses issued; and said books shall be prima facie evidence of all statements contained therein, in all courts in said District. Said board shall number consecutively all applications received, note upon each the disposition made of it, and preserve the same for reference, and shall number consecutively all licenses issued; but such licenses may be issued in series running concurrently, in which cases licenses of each series shall be numbered consecutively. Said board shall, in the month of July of each year, submit to said Commissioners a full report of its transactions during the twelve months immediately preceding.

MUST APPLY FOR LICENSE.

"Sec. 4. That any person desiring to commence the practice of

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dentistry in said district shall make application to said Board of Dental Examiners for a license so to do. Application for this purpose shall be upon a form furnished by said board, and shall be accompanied (1) by satisfactory evidence of good moral character, (2) by a diploma conferring upon the applicant the degree of doctor of dental surgery, issued after not less than three years' study of dentistry by some college authorized by law to confer that degree, and (3) by such fee as is hereinbefore provided for. Any application may be rejected for material omission or irregularity. The provisions of this section shall not, however, be construed to apply to applicants seeking licenses under the provisions of section 6 of this act.

"Sec. 5. That any person having been examined by said Board of Dental Examiners, and having been refused a license as the result of such examination, may appeal from the decision of said board. Such appeal must be in writing, addressed to the Commissioners of said District, setting forth the ground upon which it is based, and be accompanied by a deposit of $30. If, after examination of said appeal, said Commissioners deem it proper, they shall appoint an Appeal Board of Dental Examiners, consisting of three dentists having qualifications similar to those required of members of the regular Board of Dental Examiners, which shall review the examination papers of appellant, examine him in the required practical work, and report their finding to said Commissioners; and such finding shall be final and binding upon all parties concerned, and if favorable to the appellant the Board of Dental Examiners shall issue to him a license to practice dentistry in said District. The members of the Appeal Board of Dental Examiners shall each be paid a fee of not more than $10 for each candidate examined, payment to be made from the deposit of the appellant if the finding is adverse to him, but otherwise from the funds of the Board of Dental Examiners.

THOSE FROM OTHER JURISDICTIONS.

"Sec. 6. That said Board of Dental Examiners may license to practise dentistry in said District, without examination or after limited examination, any licentiate of an official State or Territorial Board of Dental Examiners who changes his residence from such State or Territory to the District of Columbia, and desires to practice dentistry therein, whenever such State or Territorial board grants equal privileges to the licentiates of the Board of

Dental Examiners of the District of Columbia. Applications for licenses under the provisions of this section shall be made upon a form provided by said board, and shall be accompanied (1) by satisfactory evidence that the applicant has been lawfully engaged in the practice of dentistry in the State or Territory from which he came; (2) by such fee as may, with the approval of the Commissioners of said District, be fixed by said board, and (3) by satisfactory evidence as to the privileges to which licentiates of the Board of Dental Examiners of the District of Columbia are entitled in the State or Territory from which the application came.

REFUSALS AND REJECTIONS.

"Sec. 7. That said Board of Dental Examiners may, by a vote of four members, refuse to grant or may revoke a license, and cause the name of any person to be removed from the register of dentists at the Health Office, upon proof that the person seeking or having obtained such license, or having been so registered, has been guilty of fraud or deception in passing the examinations herein provided for; or for chronic inebriety, including the habitual and excessive use of alcoholic beverages, opium or any of its preparations, cocaine, or other drugs producing similar effects; or for dishonorable or immoral conduct in connection with the practice of his profession. Complaint under this section shall be made in writing and under oath. The accused shall be furnished with a copy of such complaint and given a hearing before said board in person or by attorney, and witnesses may be examined for and on behalf of the complainant and for and on behalf of the accused. Appeal from the decision of said board may be taken to the Supreme Court of the District of Columbia, sitting as an equity court, and appeal thence may be taken by either party to the Court of Appeals of said District. Said board may at any time within two years after revoking a license because of inebriety or drug habit, upon satisfactory proof of recovery from such conditions, issue, without examination, to the person affected a new license to practice dentistry in said District.

REGISTRIES AT HEALTH OFFICE.

"Sec. 8. That no license to practice dentistry in the District of Columbia shall be valid until it has been registered at the Health Department of said District, nor until the fact and time of such registration have been duly indorsed on the face of such license by the Health Officer or his duly authorized representative.

"Sec. 9. That every person, partnership, association or corporation practising dentistry in the District of Columbia, or representing himself or itself, or permitting himself or itself to be represented as so practising, shall display or cause to be displayed, conspicuously, in his or its usual place of business, the licenses to practice dentistry in said District of all persons so engaged in or at such place; said place of business shall, during all reasonable hours, be open to inspection by any representative of the Police Department or of the Board of Dental Examiners of said District, so far as may be necessary to examine such licenses, and it shall be unlawful for any person to interfere with any inspection made or intended to be made for this purpose.

"Sec. 10. That no corporation not created by special act of Congress shall practise dentistry in the District of Columbia except under a special permit, to be issued by and in the discretion of the Commissioners of said District.

"Sec. 11. That no person, partnership or association practising dentistry in said District shall use, in connection with such practice, any name or designation other than the name and titles of the person or the individual names and titles of the persons composing the partnership or association.

"Sec. 12. That no person, partnership, association or corporation shall permit any person not authorized to practice dentistry in said District to perform any dental operation as his or its agent, employee or representative, or in his or its office.

RIGHTS OF STUDENTS.

"Sec. 13. That the provision of this act shall not be construed to prevent the giving, bona fide, of clinical instruction in dentistry, by and under the actual supervision of dentists lawfully engaged in the practice of that art in said District, to students duly matriculated and in actual attendance at dental colleges in said District which are authorized to confer the degree of dental surgery, nor to prevent any bona fide student of such college who is a bona fide pupil of a dentist duly authorized to practice dentistry in the District of Columbia from performing operations in dentistry under the immediate supervision and instruction and in the actual presence of the dentist of whom he is a pupil; nor to interfere with physicians in the discharge of their professional duties, and the burden of proof shall be upon those pleading exemptions under the provisions of this section to show that they are actually and legally entitled thereto.

"Sec. 14. That each and every person practising dentistry in the District of Columbia shall adopt such measures as may be necessary to insure cleanliness and prevent the spread of contagious diseases in the course of his professional work.

THE PENALTIES.

"Sec. 15. That any person who shall hereafter commence or attempt to commence the practice of dentistry, or who shall practise or hold himself out to the public as practising dentistry, in the District of Columbia, without first having complied with the requirements of this act, or who shall violate any of the provisions of this act, shall be deemed guilty of a misdemeanor, and, upon conviction thereof in any court of competent jurisdiction, shall be fined not more than $30. That any person who, as the pupil of another, shall practise dentistry or perform any dental operation out of the immediate presence of or not under the immediate supervision of the registered dentist of whom he is a pupil shall be deemed to be practising dentistry without first having complied with the provisions of this act, and, upon conviction thereof, shall be fined not more than $30. That any person who, either for himself or as a member of any partnership, association or corporation, and any partnership, association or corporation violating the provisions of sections 9, 10, 11 or 12 of this act shall, upon conviction thereof, be fined not more than $30: Provided, That students of dental colleges in the District of Columbia conferring the degree of doctor of dental surgery may, without incurring the penalties of this act, perform operations in dentistry in the infirmaries and operating rooms of the colleges of which they are matriculants, under the immediate instruction and in the presence of a dentist duly appointed for such position of instruction and supervision by the faculty of said college.

"Sec. 16. That all acts or parts of acts inconsistent with this act be and the same are hereby repealed."

O BLESSED HEALTH! Thou art above all Gold and Treasure; 'tis thou who enlargest the Soul, and openest all its powers to receive instruction, and to relish Virtue. He that has thee has little more to wish for! and he that is so retched as to want thee, wants everything with thee.—*Sterne.*

MEDICAL EXCERPT.

By T. P. CORBALLY, A. M., M. D.

We extract the following article, read before the Detroit Medical Library Association, from a recent number of "The Physician and Surgeon":

PROTONUCLEIN IN GENERAL PRACTICE, by G. W. Sherman, M. D., Detroit, Mich.

The science of bacteriology teaches that pathogenic bacteria produces poisonous substances, ptomaines and toxins, as a result of their multiplication and growth, and that these poisons usually cause the illness and perhaps the death of our patient. It has also been demonstrated that most disease-germs can inhabit the body of a susceptible animal for but a comparatively short time, causing either death or the establishment of an immunity which results in the eradication of the germ. The immunity thus established will continue through life in many cases, while in others it will disappear by the lapse of time. What the exact nature of this immunizing process is has not as yet been definitely established, but the antitoxin theory seems to be the most feasible one.

The manufacturers of Protonuclein try to explain the efficiency of this preparation on the nuclein and leucocyte theory, but if immunity is established by the production of nuclein and a resulting leucocytosis, then it is difficult to understand why it is that immediately after immunity against one variety of germ has been established, another variety may invade the body and cause disease. It is a matter of common experience to find a child taken sick with measles after a recovery from scarlet fever, or to have the streptococcus or staphylococcus invade a patient who has fairly established an immunity against scarlet fever, diphtheria or some other infectious disease, causing inflammations and abscesses which are often as serious as the original disease. It appears to me that if leucocytes are instrumental in establishing an immunity against the germs which caused the first disease in these cases, they would be equally as potent in preventing a second invasion. It appears that the germs or their toxins play an important part in the production of these immunizing substances. Any one who has given diphtheria antitoxin a fair trial in the treatment of diph-

theria can readily appreciate the plausibility of the antitoxin theory of immunity.

What the composition of nature of these immunizing substances is, and how or by what organs of the body they are produced, is still a matter of conjecture, but it is not unreasonable to suppose that the lymphatic, thymus, thyroid, splenic and similar glands have much to do with their production. If these glands have anything to do with establishing immunity against pathogenic bacteria, then it is just as reasonable to suppose that extracts from these glands will assist in curing disease, as that pepsin derived from the peptic glands will assist in digestion; and it is for the purpose of directing attention to this line of therapeutics that I wish to give my experience with Protonuclein.

According to descriptive literature pertaining to Protonuclein, this preparation is obtained by a process of simple extraction from the thyroid and thymus glands, the pineal gland and pituitary body, bone marrow, pancreas, spleen, liver, salivary glands, Brunner's glands, Lieberkuhn's follicles, peptic glands, and lymphatic structures derived from young animals. That the preparation is not a single compound, nuclein or protonuclein as its name implies, but a mixture of substances derived from the various structures from which it is obtained, is shown by the fact that it will digest albumens and starch, which the extracts from the peptic, salivary and pancreatic glands will account for. That thyroid extracts have a therapeutic value is quite well established, and that this preparation contains such extracts is apparent. If the extracts derived from the other structures from which this preparation is made have effects as varied as those obtained from the peptic, salivary, pancreatic and thyroid extracts, it is apparent that in Protonuclein we have decidedly a "shotgun" dose, and my experience with it has been that the shots which miss the mark inflict no injury. If gland extracts assist in establishing an immunity when given to persons afflicted with infectious disease, the fact will bear demonstration by practical experience at the bedside, and, thinking that my experience with Protonuclein may tend to promote clinical study, I will report a few cases, supplemented by some general statements, for your consideration.

My first practical experience with Protonuclein was on myself. About two and a half years ago I was taken with a severe attack of acute catarrhal inflammation of the nasal mucous membrane which rapidly extended down the trachea into the bronchi. It

began on a Friday morning with an almost incessant sneezing, accompanied by blocking of the nose, fulness in the head and headache, followed later in the day by a thin, copious discharge from the nose and an irritating cough. By 5 o'clock P. M. the same day my headache was severe, my limbs all ached, and taking my temperature it registered 101°. I had had similar attacks before, none apparently quite so severe, which always run a course of from one to three weeks. I had tried quinine and other remedies without any appreciable benefit, and was a willing subject to try something new. I had a few samples of Protonuclein and began to take them *ad libitum*, starting about 5 o'clock in the evening. By Saturday morning I felt some better and continued taking the preparation through all that day, still *ad libitum*, and by evening, twenty-four hours after I began its use, felt considerably improved. I continued taking more during Sunday, when my nose cleared up, and the headache, fever, cough and soreness in my limbs disappeared. By Monday evening, after three days' treatment, I was practically well and attended a meeting of the Detroit Medical and Library Association. Since then I have always prescribed Protonuclein in these acute catarrhal affections, with the same happy result. Experience has taught me that the proper dose for such cases, in the adult, is from six to twelve grains, repeated every two or three hours. The treatment should be continued with smaller doses for a few days after the disease has disappeared to prevent a relapse.

I have found Protonuclein especially useful in the treatment of broncho-pneumonia in infants and children. In these cases I usually give from two to four grains, according to age, repeated every two to three hours, and find that recovery takes place in from three to five days. I have had remarkable success in treating pneumonia with this preparation and will briefly report three cases:

Case I.—My mother, aged seventy-two years, on April 8, 1897, suffered a severe chill about 9 o'clock in the evening. Two hours later, when I first saw her, she complained of pain in the right side; was coughing up bloody mucus, and was very uneasy. Her heart had been irregular for some years, but now the pulse was 130 and her temperature 103°. Physical examination revealed pneumonia of the right lung. I prescribed two grains of phenacetin and six grains of protonuclein, to be repeated every two hours. By 10 o'clock the next day her temperature was 99 3-5° and her

pulse 108; the pain in her side was less and she felt much better. The phenacetin was discontinued and the protonuclein continued. By the third day her temperature was normal and she felt so well that, in spite of my protests, she was determined to sit up. She coughed up rust-colored sputum for six or seven days, but otherwise felt quite well. She has had no trouble with her lungs since.

Case II.—J. R., a female, aged twenty years, had a chill at 6 o'clock in the morning, followed by fever and pain in the left side. I saw patient first at 8 o'clock P. M. next day, when her temperature was 102°, pulse 115, respiration short, with pain in the left side and dulness on percussion over lower half of left lung. I prescribed six grains of protonuclein and two grains of phenacetin, and ordered the dose to be repeated every two hours. Next day at 4 o'clock P. M. her temperature was 101°, pulse 108, and she felt and looked better, but coughed up bloody mucus. The third day at 4 o'clock P. M. her temperature was 104°, pulse 120, and she felt worse, having more pain in her side, coughing up much bloody mucus, and feeling restless. On inquiry I found that she had only received her medicine every four hours instead of every two hours, as I had directed. I now prescribed nine grains of protonuclein and two grains of phenacetin and ordered that the dose be repeated every two hours. The fourth day at 3 o'clock P. M. her temperature was 99 4-5°, pulse 96, and she felt better, coughed less and had but little pain. The protonuclein and phenacetin were continued. The fifth day at 4 o'clock P. M. her temperature was 98°, pulse 83, but little bloody mucus being expectorated, lungs clearing up, and she felt like leaving the bed. The protonuclein was continued and phenacetin discontinued. The sixth day her temperature and pulse were normal, appetite good, and patient convalescent. I prescribed nine grains of protonuclein, the dose to be repeated four times a day for a few days, after which no further medication was required.

Case III.—C. G., a male, aged sixty-three years, had not felt well for several days, and was taken with a fever the day before I saw him. Patient complained of pain in his right side and difficulty in breathing. His temperature was 102 3-5°, pulse 110, and the lower portion of his left lung was inflamed. I prescribed six grains of protonuclein and ordered that the dose be repeated every two hours. The next day there was hepatization of the lower half of the right lung, with a temperature of 102° and a pulse of 108. The protonuclein was now increased to nine grains,

repeated every two hours. The third day the temperature was 101° and the pulse 100. He felt better and on examination the lung was found to be clearing up. The protonuclein was continued. On the fourth day the temperature was 98°, the pulse 84; patient had enjoyed a night's rest, appetite returning, and lung much improved. The fifth day I found my patient dressed and sitting in a chair. He said he felt well, but I persuaded him to go back to bed, fearing something might happen. I continued the protonuclein four times a day for a few days, when he made a complete recovery.

I have treated ten cases of typhoid fever with protonuclein, all of which made an unusually early recovery, considering the severity of the early symptoms of some cases. I will briefly report a few cases:

Case I.—E. H., a female, aged twenty-two years, had been sick one day. When I first saw patient her temperature was 105° and her pulse was 120. She was restless, talked in her sleep, tongue dry, skin dry, face flushed. An examination of her lungs revealed no indication of pneumonia. Diagnosis doubtful. I prescribed three grains each of protonuclein and phenacetin, to be repeated every two hours. The next day the temperature was reduced to 103½°, pulse 115, but patient still restless, skin somewhat moist, tongue dry. On the third day her temperature was 104°, pulse 118, and she felt worse. The phenacetin and protonuclein were increased to four grains each, the dose repeated every two hours. On the fourth day her temperature was 103 2-5°, pulse 121, but she felt no better. The capillary circulation was not good. The phenacetin was discontinued and protonuclein, six grains, and quinine, two grains, repeated every three hours, were given. On the fifth day her temperature was 105°, pulse 123; bowels moved three times; other conditions not improved. Diagnosis, typhoid fever. The quinine was discontinued and the protonuclein continued, six grains every three hours. Cold packs were ordered every four hours when the temperature exceeded 102°. The cold packs were not used as often as directed, but were applied three or four times a day. The temperature came down gradually and the pulse improved until the thirteenth day, when the cold packs were discontinued, the temperature no longer rising above 102°. From the sixth to the twelfth day there was considerable diarrhœa, the bowels moving from three to seven times in twenty-four hours. For this con-

dition turpentine emulsion and bismuth were given. On the morning of the sixteenth day the temperature was normal, pulse 91; the diarrhœa had ceased, she looked bright and felt good. After this the temperature varied from the normal to 101° until the twenty-third day, when it suddenly ran up to 104°. The cold pack was applied but once; her temperature came down readily and the patient made a rapid recovery, being able to sit up before the end of the fourth week. The appetite returned about the eighteenth day and was good henceforth except when she had the high fever on the twenty-third day. She lost her hair, as typhoid patients usually do, after convalescence. This case started with unusual severity and promised to be a dangerous or prolonged one. Her unusually early recovery, in my opinion, can be attributed to nothing but the protonuclein, which was continued until convalescence was completely established.

I was called to a family in which one of the city physicians had charge of two typhoid fever cases; one, aged twenty years, who had been sick three weeks, and another, aged six years, who was just convalescing after seven weeks' illness. By the time I made my second call, a few days later, two other children of the family had been taken sick. A boy seven years of age had not been feeling well for a few days, had no appetite, felt tired, tongue dry and coated, temperature 101°. I gave him four grains of protonuclein every three hours. He began to feel better in a few days, and by the eighth day had entirely recovered. I will leave the members to decide whether this was typhoid fever or not. The other case was a girl aged ten years. She had the usual symptoms of typhoid fever, with a temperature of 102½°. Protonuclein, six grains, and phenacetin, two grains, repeated every three hours, were prescribed. The temperature continued to rise until the fifth day, when it reached 104 1-5°, pulse 130. The phenacetin was discontinued and the cold pack substituted (which was poorly dispensed), and protonuclein increased to nine grains, repeated every two hours. The temperature from the fifth to the tenth day ranged between 102½° and 104½°, and considerable diarrhœa set in, which was controlled with bismuth and turpentine emulsion. From the tenth day the temperature gradually declined until the fifteenth day, when it became normal and remained so thereafter. It will be noticed that larger doses of protonuclein were used in this case than in the first case and a more decisive recovery ensued.

I have recently treated two other patients, one aged six years and the other twelve years, both girls, with large doses of protonuclein, in whom the fever ran a course almost identical with the above case. The one unusual feature in these three cases was the early appearance of the appetite. About the twelfth or thirteenth day they began to ask for food, and in a few days the desire to take nourishment became so keen that it was difficult to refuse them something more substantial than milk. All these cases lost their hair during convalescence.

Protonuclein has a wonderful effect in maintaining the spirits and vitality of a patient during fever, and has no depressing effect, while it reduces the temperature. This is particularly noticeable in typhoid cases. They do not lapse into that stupid condition which is so characteristic of this disease.

When protonuclein is taken in large doses, say ten to fifteen grains repeated every two or three hours, it produces a deafness and ringing in the ears very similar to that produced by large doses of quinine. In such doses it may also cause an unsteadiness of the nerves and an increased frequency of the heart's action. If this condition is observed during the treatment of a disease, it is well to withhold a few doses, when these symptoms will readily disappear without leaving any bad effects.

I have given protonuclein in scarlet fever with the effect of having the temperature decline and the swelling of the glands of the neck disappear while the rash was coming out. I have given it with great success in puerperal fever, erysipelas, inflicted wounds, and in fact, consider it a valuable remedy in all infectious diseases.

Protonuclein also has quite marked tonic effects which are particularly noticeable when given in cases of general debility resulting from advanced age. As a tonic it should be given in from six to nine grain doses after meals and at bedtime. In neurasthenic cases it is of benefit, restoring a normal tone to the nervous system. I have given it to a few tubercular cases, but cannot say that it was followed by especial improvement. In cases wherein the temperature is high I usually prescribe small doses of phenacetin as a palliative remedy to assist in bringing down the temperature until the protonuclein has time to produce results. I consider protonuclein a very valuable addition to our remedies in combating disease, and feel that all who use it in large doses will be gratified with its results.

TREATMENT OF CYSTITIS.—Dr. R. N. Mayfield, of New York, under the captain of "Catheters and Cystitis," "New York Medical Journal," Sept. 3, 1898, reports that typical cases of cystitis are most effectually treated by the use of hydrozone. He begins the treatment as follows:

1. Inject a quarter of a grain of cocaine dissolved in a dram of water into the membranous portion of the urethra.

2. Anoint the largest hard-rubber catheter that can be well passed into the bladder, and increase the size one number each week until the urethra is normal in size.

3. Begin with dilute hydrogen solutions—preferably hydrozone—one part to twenty of lukewarm water, using this solution freely, especially when employing the large size catheter. If the small size is used at the beginning, I recommend the use of only two or three ounces at a time until removed by the return flow. This can be repeated until the return flow is clear and not "foaming," which indicates that the bladder is aseptic.

4. Partly fill the bladder with the following solution: tincture of iodine compound, two drams; chloride of potassium, half a dram; chloride of sodium, two drams; warm water, eight ounces. Let it remain a minute or so and then remove. This treatment should be used once or twice a day.

Where I suspect extensive ulceration I recommend once a week the use of from ten to twenty grains of nitrate of silver to the ounce, and neutralize with chloride of sodium solutions.

This treatment carried out carefully will be satisfactory, as there is no remedy that will destroy bacteria, fœtid mucus, or saccu-lated calcareous deposits like hydrogen.

VALENTINE'S MEAT-JUICE is undoubtedly a valuable nutrient restorative, says Sir Thomas Longmore, M. D., F. R. C.; easily assimilated and agreeable to taste. It is especially useful for administration in cases of protracted illness attended by much debility and prostration.

During the influenza epidemic in London (a prominent symptom of which was anorexia), Mr. W. E. Dawson, physician to the Churchill Home, found it very valuable to both himself and patients. He prescribed it to both aged persons and infants suffering from bronchitis, and found that in these cases it sustained the vital powers until the crisis was passed.

THE MANNA OF THE BIBLE.—Henry Castrey contributes to "La Nature" for October 8 an interesting note on the manna of the desert which played such an important role in the history of the Jews. Even to this day the Arabs, who are compelled to traverse the sandy wastes of Arabia, not only feed their camels upon this little-known food, but utilize it for their own nourishment.

This "manna" is in reality a thallophyte, either Canona esculenta or Lichen esculentus (Sphaerothallia esculenta). This fungus is very abundant and is found upon the sand after every rain, sometimes in great heaps. It is of a gray color, is about the size of a pea and breaks with a mealy fracture. The taste is rather agreeable and slightly sweet. When eaten it acts as a laxative. Analysis shows that the fungus has the following composition:

	Per Cent.
Water	16
Nitrogenous matter	14
Non-nitrogenous matter	29
Carbohydrates	32
Fat	4
Mineral matter	5

This analysis shows that the "manna" of the Bible is rich in certain kinds of food material and, while not a complete food, it is capable of sustaining life for a time.

GERMANY'S INEBRIATES, after one more year of such carefully mitigated liberty as the dear Kaiser's subjects are permitted to enjoy, will enter upon a period of restraint calculated to fill them with mingled horror and indignation. With the beginning of 1900 there will go into effect a truly remarkable law—a law which places every habitual drunkard under an interdict involving complete submission to the will of a duly appointed "curator." This person will be empowered to put the person whom he regards as a dipsomaniac anywhere he pleases, there to undergo treatment for the malady as long as the "curator" pleases. And the new law formulates a fine, broad definition in telling what a habitual drunkard is. It says that the term includes everybody "who, in consequence of inebriety, cannot provide for his affairs, or endangers the safety of others." This measure was first advocated in Germany thirty-five years ago, but hitherto its enactment has been prevented by influences not difficult to understand. How the regula-

tion will work remains to be seen. That it may effect good results is obvious, and equally evident is the possibility that it may lead to tyranny such as would be utterly unendurable—anywhere out of Prussia.

A PRACTICAL METHOD OF FIREPROOFING WARSHIPS was described in a paper by C. J. Hexamer, Ph. D., before the Franklin Institute last month. It was the result of inquiries from the Government. Briefly stated, the process consists in the injection, after a proper preliminary preparation, of a solution of water glass, which is afterward rendered insoluble, the silica completely coating the inner fibres of the wood. The cost is necessarily considerable, but not beyond what its utility will fully justify.

The whole matter of fireproofing has, partly through the labors of Dr. Hexamer, been reduced to a cost which should make it more seriously considered by underwriters. A mere superficial treatment is all that is needed to convert ordinary vessels and buildings into slow-burning structures.

DIPHTHERIA AND ANTITOXIN.—Recent statistics show that in the Charite Hospital in Berlin during the eight years that preceded the antitoxin treatment in 1894, the fatality rate of diphtheria was 53.6. During the four-year period from March, 1894, to March, 1898, the mortality rate was only 15.9 per cent.

In all the Berlin hospitals in the four years from 1890 to 1893, inclusive, with 8,080 diphtheritic admissions, there were 3,106 deaths, or 38.4 per cent., whereas in the four years of antitoxin treatment, from 1894 to 1897, inclusive, with 10,026 admissions, there were only 1,823 deaths, or 18.2 per cent.

In London the records of the Metropolitan Hospital show that antitoxin has almost banished death in those cases treated with it on the first day of the disease. Where the percentage of deaths was 22.5 under the old-fashioned treatment in 1894 it decreased to 11.7 in 1895, to 4.7 in 1896 and vanished in 1897. It is worthy of remark in this connection that the probability that the treatment was not always on the first day in these cases makes the figures all the more striking in favor of antitoxin. The decrease of mortality in all cases of diphtheria in the Metropolitan Hospital, irrespective of the day of admission, was from 29.6 per cent. in 1894 to 17.5 per cent. in 1897.

INFLUENZA IN NEW ENGLAND.—As to the articles that have been written on *la grippe* since it has become a prevalent epidemic disease in this country their names are legion, and my only excuse for offering anything additional to the medical profession is that my experience with the disease has been confined to a section of country (S. B. Overlook, M. D., of Steuben, Me.; New York "Medical Journal") different from that of any author's whose article has come to my notice. Also, that while the mortality has been high in towns but a few miles distant from this, out of over three hundred cases to date, not one of them has ended fatally here.

Clinical features have varied according to age and physical condition of the patient. In children under ten or twelve years of age vomiting has been an almost constant symptom. Constipation has prevailed in a large majority of cases; in a few the reverse has been present—diarrhœa. In adults, rapidity of pulse, marked rise in temperature, cephalalgia and pain in limbs have been constant symptoms for first 24 hours. At the end of this time a cough and acute bronchitis are prominent features. In aged people there is a sense of fatigue, nervous depression, sometimes somnolence.

A general plan of treatment has been followed, varying, of course, with the age and general physical condition of different patients. In sthenic subjects with high arterial tension, marked rise in temperature, cephalalgia, pain in limbs, if there has been no movement of the bowels for the previous twenty-four hours or longer, a full dose of calomel was usually given, and if this failed to produce an evacuation in twelve hours, it was followed by a saline. In one hour ten grains sulphate of quinine with Dover's powder was given. In a short time the skin became moist, arterial tension began to lower, cephalalgia and pain in the limbs to abate. Tincture of aconite in small doses frequently repeated was given, watching meanwhile respiratory movements. The aconite seemed to lessen the amount of work done by the organs of respiration, and by blunting sensibility of the sensory nerves relieved the neuralgic pains. In most cases, however, antikamnia was used with the best results. Usually after twenty-four hours' treatment arterial tension has become nearly normal, temperature is reduced in a marked degree, and there is little or no pain in head or limbs. When bronchitis was present, as it may be said to have been in every case, an expectorant mixture consisting of fluid extract of ipecac, chloroform and syrup of squills or syrup of tolu was given every two, three or four hours, according to indications. Pneumonia, as a complication, received the usual treatment.

EDITOR'S TABLE.

SANITARIAN, FEBRUARY, 1899.

☞All correspondence and exchanges, and all publications for review, should be addressed to the Editor, Dr. A. N. Bell, Brooklyn, N. Y.

ERROR CORRECTED.—January number: For "172," tenth line from bottom of page 41, read 127.

INFLUENZA, now prevalent in this country, is a purely epidemic disease, with no traceable locality, and is of doubtful conditions It has a record of several centuries, and appears at one time or another to have prevailed in every portion of the inhabitable globe. Although it at times appears to follow lines of traffic, its progress generally is so irregular as to well nigh defy tracing. It sometimes appears simultaneously at widely separated points, even skipping over entire countries, perhaps to appear in them later. Its progress is commonly rapid, but not more so than human travel and traffic; but at other times it is slow and halting, and confined to particular towns or comparatively limited areas, and these exceptions lead to mistaken notions with regard to its conditions. It quickly reaches its maximum limit in a given centre, and seldom remains more than a few weeks, perhaps to return again, however, in the course of the same pandemic.

The present epidemic in the United States, which has much more severely attacked the public press than the people, according to the "Public Health Reports" of the Marine Hospital Service, seems to have started in the East, having been reported in Turkey about the middle of November, whence it spread Westward, following the lines of travel. During its prevalence all sorts of complaints and complications are attributed to it, in so much as to render its diagnosis doubtful and the ratio of mortality from it very uncertain.

FOR A NEW FLOATING HOSPITAL.

Mrs. Helen C. Juilliard Contributes $32,000 to the Work of St. John's Guild.

At the recent annual meeting of St. John's Guild, New York, the officers set forth in their reports the necessity of providing for

another floating hospital, as well as increasing the capacity of the seaside hospital, to enable the Guild to care for poor sick children in the Summer time. The reports showed that not only were the accommodations of the present floating hospital overtaxed, but that in many instances children had to be left behind. At the last meeting of the Board of Trustees, in response to the officers' appeal for funds, the following letter was read:

The Hon. William L. Strong, President St. John's Guild:

My Dear Colonel—I now want to confirm the message that I sent you last evening through Mr. Juilliard, promising to pay for a new boat for the use of St. John's Guild, and I authorize you to make the contract for said boat, and to draw on me for such amounts as you may require from time to time as payments become due to the amount of $32,000. You must let me congratulate the Guild on having an officer who is willing to devote his thought and time to its welfare, and whose heart is touched by the suffering of God's little ones. Very sincerely yours,

HELEN C. JUILLIARD.

John W. Weed and John P. Faure were authorized to prepare a reply to Mrs. Juilliard, informing her that the Trustees, as a mark of their appreciation of her gift, would name the new floating hospital the Helen Juilliard. The work of completing the plans for the new floating hospital will be taken up at once, and the Trustees hope to have it ready for use by July 1, 1899. The new barge will enable the Guild to include in its trips sick babies from Brooklyn as well as from Manhattan.

The Trustees desire now to add at once to the capacity of the seaside hospital at New Dorp, S. I., as its work will be increased by the use of the new floating hospital. The seaside hospital now has a capacity of 350 child patients daily. It is desired to increase this capacity to 500. This will increase the cost of the work of the Guild during the Summer months, and additional funds will have to be provided. There are two committees in charge of the funds for this work. One is the Committee on Appeal for Funds, with William Sherer as chairman; the other the Building Committee, with John P. Faure, secretary of St. John's Guild, as chairman.

THE SMOKE NUISANCE.

There is encouragement by the recent trial and conviction of a man in New York for fouling the air with soft coal smoke. He

was the proprietor of a steam-heating concern, an interesting circumstance in view of the fact that it was a steam-heating concern that first menaced the city with the smoke nuisance, a dozen or more years ago, and which provoked the authorities to take the first vigorous steps toward defence of the city against it. The fine imposed, $25, seems small, compared with the magnitude and wantonness of the offence. But perhaps it will serve. A small penalty, promptly and unsparingly imposed, is more effective than a larger one concerning the imposition of which there is a broad margin of doubt.

And this penalty should be imposed in every case without delay and without leniency. The people who are defiling the air of this city with black smoke have no excuse whatever. They can offer no palliation of their offence. They are breaking the law in a particularly odious manner. They know they are doing so. They do it purposely. They are simply hoping the law will not be enforced against them, or seeing how long they can escape its execution upon them. They knew when they began using soft coal that they were going to violate the law, just as much as a burglar knows it when he breaks into a bank. They practically said: "We can increase our profits a little by breaking the law, and so we will break it." All other pretense is simply absurb. They are therefore to be dealt with as deliberate and habitual law-breakers, upon whom the penalty of the outraged law should be visited to the fullest possible extent.

STATE PARK FOR HEALTH SEEKERS IN MINNESOTA.

The project has been undertaken by the physicians of Minnesota ("Minneapolis Times," December 17) to set apart some 2,000 acres or more of the salubrious forest region of that State, in the Leech Lake reservation, or should any other region be preferred, after due investigation, as a State Sanitary Park.

Northern Minnesota has been long recognized as a peculiarly healthful region, but during recent years too much neglected on account of the greater enterprise of the citizens in some other States in favor of regions even less salubrious. The misfortune has been that, while many physicians throughout the country have an abiding faith in the attributes of the climate of Northern Minnesota for consumptives, and advise their patients accordingly, little or no accommodation has been provided for such patients. The result is that, while invalids have been more or less constant-

ly visiting there, pursuant to the advice of their physicians, they soon become discouraged by the state of unpreparedness, as compared with other regions which they are led to seek, though inferior in climatic advantages. It is well that the physicians of the State are at last awakened to the importance of acting upon these now recognized conditions. A committee of them have reported to the State Medical Society as follows:

"Minneapolis, Minn., December 15, 1898.

"To the President of the State Medical Society:

"Sir—Your special committee appointed to investigate and report as to the feasibility of a State sanitary resort in the pine regions of Northern Minnesota beg leave to report as follows:

"That they have given the matter careful consideration and find, with profound regret, that the acreage of primeval pine accessible to the centres of population are so rapidly diminishing that any effort to secure a large tract thereof must be prompt and immediate.

"The growing popularity and success of such forest reserves as those of New York, New Hampshire and Ontario afford ample precedent for prompt action on the part of our young and enterprising Commonwealth.

"Minnesota is peculiarly fortunate in having in the northern part of the State a most happy combination of sandy soil, pine timber and moderate elevation, thus affording ideal conditions for health resorts for the relief of consumptives, neuresthenics and all invalids in need of rest.

"The efficiency or curative value of large tracts of coniferous forests in the cure of pulmonary affections has been fully demonstrated by the large percentage of cures in the Adirondack region and in the pine forests of Georgia. Such tract, if sufficiently extensive, could also be made available as a game preserve for such valuable game as are now native, but unfortunately being rapidly exterminated, or for such other game as might be introduced from time to time.

"It could also be made the field of scientific forestry demonstration, and an object lesson for future generations, as well as the present one.

"Your committee believes that now is the opportune time to secure such timber land, thus avoiding the large expenditure of money necessary later, the error of delay in the matter of expense

being well exemplified in the greatly added cost of the Adirondack reserve.

"Your committee, therefore, earnestly and unanimously recommend that the Legislative Committee of the State Medical Societies be requested to immediately call the attention of the Governor-elect to this important subject, in order that he may direct the attention of the Legislature to the same. Your committee would also further suggest that the Legislative Committee consider this matter in detail at an early date and urge either State or National legislation, as may be deemed wisest to secure the end in view. (Signed.)

"H. H. Kimball, M. D.; E. L. Mann, M. D.; Parks Ritchie, M. D.; W. S. Briggs, M. D.; Thomas F. Quinby, M. D.; George E. Ricker, M. D.; W. S. Laton, M. D.; William E. Leonard, M. D., secretary; J. W. Bell, M. D., president."

Moreover, it is understood that the merchants of Walker (on Leech Lake) are so anxious to have the park located thereabouts that they have written to business men in Minneapolis, St. Paul, Duluth and the East, with whom they trade, and with the State's representatives at Washington, urging them to do all in their power to help the movement along. Even the better class of Indians on the Leech Lake reservation favor giving up a portion of their land in behalf of the project. It would be a pretty good guaranty that there would be no more serious trouble with the whites.

CUBA.

Habana.—While the report of Col. Waring's inspection adds little or nothing that is new to what has been long known of Habana's unsanitary condition, it serves, or, at least, *should* serve, to bring home to our Government the responsibility that now rests upon it for not doing that which Spain has long done, and against which we have contended. Habana has been not a menace to the public health of this country merely, but the most fruitful source of yellow fever hither for half a century, at a cost of many thousand lives and millions of money. Cleanliness there has been unknown and unattempted. According to an article in the January "Forum" by Mr. G. E. Hill, private secretary, and embodying the

views, of Col. Waring, in nearly every Habana house the privy vault and the waste vault occupy a space practically under and almost in the kitchen, and as there are no ventilation pipes the nauseous odors are sent through the house and pervade the street. Garbage is universally thrown into the street; so are dead animals, which are left for the buzzards. The street cleaners are not required to remove them nor to clean the great mud holes, "covered with green slime and choked with filth of all kinds." The city has no sewerage system. "Some few leaky drains, of defective grade, close to the surface, serve to receive the overflow from some privy vaults and to allow the liquid filth to soak into the soil." The markets are foul and unfit for use as food distributors. "The blood and offal from the slaughter-houses are flushed into a small creek, which carries them as far as the edge of the harbor and there deposits them. Both creek and harbor are reeking with putrid filth." Col. Waring says:

"The southerly edge of the harbor is bordered by broad marshes, through which flow a number of watercourses, and to which these bring the offscouring of a poor quarter of the town, and especially the effluent of the slaughtering pens and of other foul establishments; while a large portion of the flat is used as a dumping ground for garbage. This intimate relation of marsh and filth is greatly aggravated by the admixture of fresh and salt water, by occasional floods, and by a daily scorching sun. The vicinity of such marshes would be deadly (in this climate), even to a veritable 'City of Hygeia.' Their proximity to this foul, fever-cursed town has always been recognized as disastrous, even by intelligent Habaneros themselves."

The relation of these conditions, considering the climate of Habana, is known to all sanitarians. Their toleration is a crime by any people. The duty of wiping them out is now devolved upon us. Their continuance is a danger to the people of this country, compared with which the war that has just been concluded is altogether insignificant. Nor should there be any delay: war on filth is always timely and everywhere, but this incident of the war involves humanity, patriotism and self-interest to a degree wholly incomparable with any other, and it should be dealt with at once. Its postponement until another summer has passed may cost the country another $100,000,000 and many precious lives—more than ten times the amount of money and ten thousand times more lives than immediateness in sanitary work.

Santiago is already an object lesson. There was simply a shifting of the forces. Gen. Wood, the accomplished officer placed in charge of the city on its surrender, lost no time on account of the weather—the necessity was all the more imminent for the aggravating conditions of heat and flood. Possibly a few more lives of the white-winged host were lost in the contention with filth at such an inclement season, but for every one so lost a hundred were redeemed; no true soldier could shrink from the charge.

Robert P. Porter, special commissioner to Cuba and Puerto Rico, on his return in the latter part of December, reported that the disagreeable smells of the typical Cuban city, as well as yellow fever, had been dispelled from Santiago, while whitewash, limewash, fresh paint and all sorts of disinfectants have deodorized the surrounding atmosphere and made the old town quite habitable. The streets are no longer used as sewers, and the unhappy individual who violates the law and escapes the lash of the Sanitary Commissioner's whip is compelled to work on the streets for thirty days. This official, Major Barbour, with 126 men dressed in spotless white, and 32 good United States mule teams and carts, having dug out from the streets of Santiago the filth of ages, is now able to keep them absolutely clean. Every day, by the aid of petroleum, the garbage of the city is burned. The work of sanitation is not confined to the streets, but extends to the dwelling houses, shops and buildings of all kinds. To accomplish this, however, the doors of houses had to be smashed in, and the people making sewers of the thoroughfares were publicly horsewhipped in the streets. Eminently respectable citizens were forcibly brought before the commanding general and sentenced to aid in cleaning the streets they were in the habit of defiling. The campaign has ended in a complete surrender to the sanitary authorities, and the inhabitants of Santiago, regardless of class, have had their first object lesson in the new order of things inaugurated by the war. Several important streets have been repaved; all the public buildings have been thoroughly cleaned, the work even extending to the Opera House.

HAWAII.

The Honolulu correspondent of the Washington "Star" (December 22) says of the New York regiment which had been stationed there for four months and had then (December 12) departed homeward, leaving under great mental depression: "They

left behind them a large percentage of their number in hospitals, and some scores in their graves. The sad feature in this sickness and mortality is, that it was entirely preventable. During the latter half of their stay an epidemic of typhoid fever raged among them. This sickness was wholly a natural consequence of the unsanitary management of their camp. A battalion of engineers, encamped in the same vicinity, were entirely exempt from such sickness, simply because they strictly observed well-known sanitary precautions. Such was the conclusion arrived at by our experienced local board of health, after due inspection. The sinks or latrines of the New Yorkers were imperfectly treated with earth covering. This probably carried typhoid germs thence to the food of the men.

"Who was chiefly to blame, I am not sufficiently informed to say. In general, the evil may be imputed to the imperfect training and discipline of volunteer troops and of their officers. Nothing can be more absurd than to charge it, as General Merriam is reported to have done, to the unhealthfulness of Honolulu. One can hardly believe that he called this a typhoid-infected town. During the whole period of the pestilence at Camp McKinley there was scarcely a case of typhoid in the city, and I believe not a single case in the populous Waikiki suburb, except in the neighboring camp. The published reports of the Board of Health show only nine cases of typhoid fever to have occurred in Honolulu in 1896, and twelve in 1897. But suddenly a camp of 1,500 soldiers in a suburb develops some hundreds of cases, and General Merriam (as reported) says it is because Honolulu is an unhealthful city."

THE PHILIPPINES.

The "Journal d'Hygiène" of the 17th of November, 1898, takes from "Las Sciencias Medicas de Filipinos" the following statistics of the demography and sanitary conditions in Manila for the year 1896:

The rigor of the climate makes Manila one of the most unhealthful cities in the extreme Orient. There are two seasons, very distinct—the dry and the season of almost continuous rain.

The mean annual temperature is as follows:

From November to March, 72.5° to 81.5° Fahr.

From March to June, 84° to 93° Fahr.

From June to November, 77° to 88° Fahr.

1. The number of inhabitants in the city in 1896 was 196,764, omitting a floating population of about 2,000 and about 44,000 Chinamen, not included in the settled population.

2. The number of births in 1896 was 6,171 and the deaths 6,670, a decrease of 500, a condition which proves the unhealthy nature of Manila and its surrounding districts, and proves also that, if immigration did not supply the decrease, the city would, in time, be entirely depopulated.

3. The most unhealthful districts are: Malate, San Miguel, Paco v Dilao and the Ermita; the most healthful are: Manila *intra muros,* Binondo, Tondo and Santa Cruz.

The diseases that cause the greatest number of deaths are: First, affections of the digestive organs, then tuberculosis, those of the respiratory organs, paludism, including marsh or malarial diseases, variola, measles, beriberi, anemia, rheumatism and affections of the circulatory system. Of these latter there are, however, comparatively few cases.

The sanitary conditions vary in different parts of the island of Luzon with change of elevation, distance from the sea coast and density of forests, but, like all tropical climates, the changes from extreme dry heat to copious and almost continuous rain have always a powerful influence on the sanitary condition not only of Luzon, but of all the other islands.

"SOME MINOR CAUSES AND CONDITIONS RELATIVE TO THE SPREAD OF TYPHOID FEVER."

Under this caption, the "Boston Medical and Surgical Journal" of December 22 thus concisely sums up most of the conditions and circumstances under which the specific poison of typhoid fever spreads from the sick to the well:

"The most common medium of transmission of the typhoid germ is unquestionably the water supply, either public or private, and the natural tendency of water to run down hill, carrying these excreta with it from the houses of the sick into the wells, ponds and streams used as water sources, explains the frequency of this mode of infection. The serious epidemics at Lawrence, Lowell, Newburyport, at Plymouth, Pa., Chicago and Philadelphia were all traceable to this cause and mode of infection. Dr. Ernest Hart rendered a useful service in collecting a very large number of such epidemics and publishing them under the name of 'Water-borne Typhoid.'

"Probably at least three-quarters of the extensive epidemics of typhoid fever have been of this character.

"Closely allied to the water epidemics are those which are commonly ascribed to the milk supply, and in these the primary medium of transmission is undoubtedly the polluted water which in some way or other gains access to the milk, either as an adulterant, or in its use for the washing of the receptacles in which the milk is stored or transmitted from producer to consumer, since no evidence has ever been produced to show that typhoid fever infection could be transmitted to the milk by means of polluted water which the cows had swallowed.

"The foregoing methods of transmission having been eliminated, there yet remain other modes which recent observations have shown to be possible. At Lawrence, Mass., after the introduction of a filter for purifying the entire water supply of the city, and reducing the death rate from typhoid fever to less than one-tenth of its former proportions, and eliminating certain cases among persons who were known to have drunk the water of the canals in the city, there still remained unexplained other cases, some of which appeared to be due to the return of persons from certain summer resorts where the sanitary conditions were seriously at fault and where these persons had contracted the disease. From a statement in the last report of the State Board of Health it appears that an inspection of these resorts, picnic grounds, etc., has been made which showed that many of these places afforded conditions unusually favorable for the spread of disease, but in many instances the proprietors had shown themselves willing to comply with suggestions as to much-needed improvements. The number of these places in the neighborhood of cities and large towns has greatly increased since the introduction of electric railways running in every direction.

"Another source of infection which has become manifest in recent years is the ice supply. Well-authenticated cases of typhoid fever have, in recent years, been traced to the use of ice from ponds and streams polluted with sewage. The need of protection in this direction has shown itself in the trend of public legislation in the past twenty years, and at least three different laws have been enacted in Massachusetts for the protection of the community against the sale of polluted ice.

"It is remarkable that thus far the cities and towns of Massachusetts which have taken action under these statutes have been chiefly those of the western part of the State (North Adams, Holyoke and Worcester), in which the actual degree of pollution has been much less than that of Eastern Massachusetts. The

extent of water pollution depends very largely upon density of population, and the greater density is that of the Metropolitan District. There are ponds still in use as sources of ice supply in Brighton, Arlington, Lynn, Wakefield, Melrose and Woburn, upon whose water-sheds the population is from 1,000 to 1,500 per square mile, and into which sewage is constantly running without let or hindrance. The authorities of these places, as well as those of western towns, have power to prohibit the sale of this ice.

"Another source of typhoid infection is to be found in those shell-fish which are eaten raw. Many different kinds of shell-fish are eaten raw in England and upon the continent of Europe, but in America the oyster is almost the only kind which is thus used.

"The report of Dr. Bulstrode to the Local Government Board of England in 1895 showed conclusively that epidemics of typhoid had been due to the use of oysters from places upon the coast of England which were polluted by sewage. Similar epidemics have also been reported from Connecticut and from Amherst College, due to the same causes. It is not unreasonable, therefore, to suppose that some of the unexplained cases which occur in our cities in the autumn may be due to the eating of raw oysters gathered from sewage-polluted waters. The season of greatest typhoid prevalence coincides with the beginning of the oyster season. The actual intensity of sewage-pollution in the Providence River, noted for its oyster-beds, is far greater than that of any of the sea-coast oyster-beds mentioned in the report of Dr. Bulstrode. The Providence River and Narragansett Bay receive the sewage of about 300,000 inhabitants, living in Providence, Pawtucket, Worcester and other places contributing to the water-shed of the bay, and this sewage-polluted stream floats to and fro over the oyster-beds at each turn of the tide."

Beds of the Various Nations.—In England the old four-poster bedstead is still the pride of the nation, but the iron or brass bedstead is beating it out of the field. The English beds are the largest beds of the world. A peculiarity of the German is its shortness; besides that, it consists frequently in part of a large down pillow or upper mattress, which spreads over the person and usually answers the purpose of all the other ordinary bed-clothing combined. In the tropics men sleep in hammocks or upon mats or grass. The East Indian unrolls his light, portable charpoy or mattress, which, in the early morning, is again rolled to-

gether and carried away by him. The Japanese lie upon matting, with a stiff, uncomfortable wooden neck rest. The Chinese use low bedsteads, often elaborately carved, and supporting only mats or coverlids. The ancient Greeks and Romans had their beds supported on frames, but not flat like ours. The Egyptians had a couch of peculiar shape, more like an old-fashioned easy chair, with hollow back and seat.

WOOLEN QUILTS AND MATTRESSES.—Iowa State Board of Health has found occasion to make strict regulations in regard to woolen quilts and mattresses made of old rags. It is found that these articles are made from the vilest materials, gatherings of ash barrels and refuse of all kinds, and the cheapness of the raw material permits their sale at such low rates as to give them a market. The danger to the public lies in the fact that some of the material may be infected with disease germs.

OBITUARY.

DR. JOHN B. HAMILTON, formerly Surgeon-General of the United States Marine Hospital Service, died at Elgin, Ill., December 24. For over a year he had been superintendent of the State Asylum for the Insane at Elgin. He was born in 1847 in Otter Creek, Jersey County, Ill., and was graduated at Rush Medical College, Chicago, in 1869. In 1874 he was appointed assistant surgeon in the United States Army, from which he resigned in 1876 and entered the Marine Hospital Service. Three years later he was appointed Supervising Surgeon-General to fill the vacancy caused by the death of Dr. John M. Woodworth. To Dr. Hamilton belongs the credit of introducing the first visual examination of pilots and the physical examination of merchant seamen as preliminary to shipment. In June, 1891, he resigned his commission as Supervising Surgeon-General and was assigned to duty for three years at Chicago, in charge of the Marine Hospital there. In 1896, on being ordered to duty at San Francisco, he resigned from the service to escape it.

Dr. Hamilton was professor of surgery of the Rush Medical College and the Chicago Polyclinic, surgeon to the Presbyterian Hospital and consulting surgeon to St. Joseph's Hospital and the Central Free Dispensary, and was the editor of the "Journal of the American Medical Association."

MORTALITY AND MORBILITY REPORTS AND REVIEWS.

Correspondents under this head are particularly requested to be as prompt as possible.

NEW YORK, 6,789,313, Nov., '98: Total deaths, 8,709; under 5 years, 1,970; annual death rate per 1,000, 15.75; from typhoid fever, 189; diphtheria, 242; phthisis, 1,059; acute respiratory diseases, 1,288.

City of New York, 3,438,899, Nov., '98: Total deaths, 4,695; under 5 years, 1,308; annual death rate per 1,000, 16.6; from typhoid fever, 82; diphtheria, 136; phthisis, 641; acute respiratory diseases, 855.

Borough of Manhattan, 1,911,755, Nov., '98: Total deaths, 2,654; under 5 years, 741; annual death rate per 1,000, 16.8; from typhoid fever, 38; diphtheria, 59; phthisis, 373; acute respiratory diseases, 507.

Borough of the Bronx, 137,035, Nov., '98: Total deaths, 206; under 5 years, 57; annual death rate per 1,000, 23.3; from typhoid fever, 4; diphtheria, 11; phthisis, 64; acute respiratory diseases, 30.

Borough of Brooklyn, 1,197,100, Nov., '98: Total deaths, 1,481; under 5 years, 421; annual death rate per 1,000, 15.0; from typhoid fever, 36; diphtheria, 53; phthisis, 173; acute respiratory diseases, 270.

Borough of Queens, 128,042, Nov., '98: Total deaths, 186; under 5 years, 57; annual death rate per 1,000, 17.5; from typhoid fever, 3; diphtheria, 11; phthisis, 17; acute respiratory diseases, 36.

Borough of Richmond, 64,927, Nov., '98: Total deaths, 108; under 5 years, 32; annual death rate per 1,000, 20.0; from typhoid fever, 1; diphtheria, 2; phthisis, 14; acute respiratory diseases, 12.

Albany, 100,000, Nov., '98: Total deaths, 140; under 5 years, 27; annual death rate per 1,000, 16.8; from typhoid fever, 7; diphtheria, 7; phthisis, 22; acute respiratory diseases, 14.

Troy, 65,000, Nov., '98: Total deaths, 108; under 5 years, 20; annual death rate per 1,000, 20.0; from typhoid fever, 2; diphtheria, 3; phthisis, 16; acute respiratory diseases, 24.

Utica, 55,000, Nov., '98: Total deaths, 73; under 5 years, 9; annual death rate per 1,000, 16.0; from diphtheria, 4; phthisis, 9; acute respiratory diseases, 11.

Syracuse, 120,000, Nov., '98: Total deaths, 126; under 5 years, 23; annual death rate per 1,000, 12.6; from typhoid fever, 5; diphtheria, 7; phthisis, 18; acute respiratory diseases, 15.

Buffalo, 360,000, ov., '98: Total deaths, 333; under 5 years, 87; annual death rate per 1,000, 21.5; from typhoid fever, 3; phthis-theria, 16; phthisis, 32; acute respiratory diseases, 40.

Rochester, 175,000, Nov., '98: Total deaths, 173; under 5 years,

31; annual death rate per 1,000, 12.0; from typhoid fever, 1; diphtheria, 11; phthisis, 16; acute respiratory diseases, 23.

Yonkers, 40,000, Nov., '98: Total deaths, 50; under 5 years, 10; annual death rate per 1,000, 15.0; from diphtheria, 0; phthisis, 10; acute respiratory diseases, 13.

Cohoes, 24,000, Nov., '98: Total deaths, 43; under 5 years, 13; annual death rate per 1,000, 21.5; from typhoid fever, 3; phthisis, 2; acute respiratory diseases, 9.

Kingston, 25,500, Nov., '98: Total deaths, 40; under 5 years, 7; annual death rate per 1,000, 18.5; from phthisis, 7; acute respiratory diseases, 2.

Poughkeepsie, 23,200, Nov., '98: Total deaths, 29; under 5 years, 4; annual death rate per 1,000, 15.0; from typhoid fever, 0; diphtheria, 1; phthisis, 7; acute respiratory diseases, 2.

Newburgh, 24,536, Nov., '98: Total deaths, 27; under 5 years, 4; annual death rate per 1,000, 13.0; from typhoid fever, 0; phthisis, 4; acute respiratory diseases, 5.

Schenectady, 24,374, Nov., '98: Total deaths, 28; under 5 years, 6; annual death rate per 1,000, 140; from phthisis, 3; acute respiratory diseases, 8.

Binghamton, 34,514, Nov., '98: Total deaths, 46; under 5 years. 8; annual death rate per 1,000, 16.0; from typhoid fever, 4; diphtheria, 3; phthisis, 4; acute respiratory diseases, 3.

Elmira, 30,000, Nov., '98: Total deaths, 36; under 5 years, 3; annual death rate per 1,000, 14.4; from typhoid fever, 1; phthisis, 9.

Oswego, 22,000, Nov., '98: Total deaths, 25; under 5 years, 5; annual death rate per 1,000, 13.5; from typhoid fever, 0; phthisis, 3; acute respiratory diseases, 1.

Leroy, Dec. 29.—Dr. Curtis, inspector for State Board of Health, found three cases of smallpox here yesterday.

CALIFORNIA.—San Francisco, 360,000, Nov., '98: Total deaths, 593; under 5 years, 108; annual death rate per 1,000, 19.8; from typhoid fever, 15; diphtheria, 6; phthisis, 89; acute respiratory diseases, 44.

COLORADO.—Denver, 167,000, Nov., '98: Total deaths, 180; under 5 years, 25; annual death rate per 1,000, 10.3; from typhoid fever, 8; diphtheria, 1; phthisis, 41; acute respiratory diseases, 13. Expectoration on the floors of elevators and street cars is now prohibited on penalty of not less than $2 nor more than $5 for each and every offence. Smallpox exists at Florence, but not an epidemic, said the secretary of the State Board of Health last night (Dec. 25), after having just returned from a visit to the locality. There were fourteen cases in the town. It was determined to insist on the vaccination of every inhabitant of Florence.

CONNECTICUT—168 towns, 893,060, Nov., '98: Total deaths,

1,024; under 5 years, 210; annual death rate per 1,000, 13.7; from typhoid fever, 22; diphtheria, 42; phthisis, 117; acute respiratory diseases, 118.

New Haven, 112,000, Nov., '98: Total deaths, 148; under 5 years, 27; annual death rate per 1,000, 16.1; from typhoid fever, 3; diphtheria, 1; phthisis, 15; acute respiratory diseases, 14.

Hartford, 80,000, Nov., '98: Total deaths, 105; under 5 years, 18; annual death rate per 1,000, 14.4; from typhoid fever, 4; diphtheria, 0; phthisis, 7; acute respiratory diseases, 13.

Bridgeport, 65,000, Nov., '98: Total deaths, 19; under 5 years, 17; annual death rate per 1,000, 12.7; from diphtheria, 10; phthisis, 6; acute respiratory diseases, 1.

Waterbury, 45,000, Nov., '98: Total deaths, 49; under 5 years, 17; annual death rate per 1,000, 13.0; from typhoid fever, 0; diphtheria, 5; phthisis, 3; acute respiratory diseases, 8.

DISTRICT OF COLUMBIA, 280,250, 2 weeks, Dec. 10, '98: Total deaths, 236; under 5 years, 59; annual death rate per 1,000, 21.8; from typhoid fever, 13; diphtheria, 15; phthisis, 27; acute respiratory diseases, 27.

FLORIDA, 45 counties, 391,422, Oct., '98: Total deaths, 514; under 5 years, 143; annual death rate per 1,000, 16.9; from typhoid fever, 116; diphtheria, 2; phthisis, 33; acute respiratory diseases, 24.

ILLINOIS.—Chicago, 1,750,000, Nov., '98: Total deaths, 1732, under 5 years, 527; annual death rate per 1,000, 14.0; from typhoid fever, 56; diphtheria, 81; phthisis, 178; acute respiratory diseases, 259. Smallpox has been reported (Dec. 28) at Briggsville. The State Board of Health is using every endeavor to prevent the spread of the disease. Measures were taken one hour after the first case was rported to the board.

INDIANA.—The Secretary of the State Board reports from observers in all parts of the State for the month of December, the returns indicate an enormous increase in influenza, with slight increase in bronchitis, pneumonia, tonsillitis and rheumatism. The diseases which decreased in area of prevalence were typhoid fever, intermittent fever, diphtheria and croup, scarlet fever, pleuritis, whooping-cough, inflammation of bowels, dysentery and puerperal fever.

IOWA.—Dubuque, 45,000, Nov., '98: Total deaths, 39; annual death rate per 1,000, 10.3; from typhoid fever, 1; diphtheria, 4; phthisis, 4; acute respiratory diseases, 3.

Davenport, 36,000, Nov., '98: Total deaths, 27; annual death rate per 1,000, 9.3; from diphtheria, 2; phthisis, 3; acute respiratory diseases, 1.

KANSAS.—The Marion County authorities (St. Louis "Globe-Democrat," Dec. 28) are finding it difficult to control the smallpox. Hillsboro now has two cases in the town. The last one to take the disease was Dr. Roher, of that place. Many Mennonites pay no attention to quarantine regulations, and as a result the number of cases and persons exposed through the country is increasing.

LOUISIANA.—New Orleans (Times-Democrat), Dec. 27: The Council, by a unanimous vote, has passed an ordinance providing for sewerage, drainage and the improvement of the water works system of the City of New Orleans. The plan has been well considered, and the future of the city is dependent upon its execution. In order to provide the means of carrying out the scheme, the people will be asked to vote the levy of a 2½-mill tax. The date of the election has been fixed for the first Thursday of February. The taxpayers of New Orleans must determine on that day whether our city must remain dormant, stationary, a prey to epidemic diseases, or whether by providing herself with these necessary improvements, she will guard against the return of yellow and typhoid fever, and move on to that position among American cities which is certainly hers by right of location and natural advantages.

MARYLAND.—Baltimore, 506,398, Oct., '98: Total deaths, 714; under 5 years, 258; annual death rate per 1,000, 16.9; from typhoid fever, 24; diphtheria, 47; phthisis, 68; acute respiratory diseases, 51. Diphtheria has been reported (Dec. 13-Jan. 9) in Hyattsville, New Cumberland and Mont Alto, smallpox in Hagerstown.

MASSACHUSETTS.—Boston, 528,912, Nov., '98: Total deaths, 874; under 5 years of age, 242; annual death rate, 19.83; deaths from diphtheria, 25; typhoid fever, 19; phthisis, 100; pneumonia, 121; bronchitis, 34.

THE twenty-ninth annual report of the State Board of Health, for the calendar year 1897, is a volume of nearly 800 pages. Reference is made to the last annual report, in which it was shown that there had been a general decrease in the death rate from the principal infectious and preventable diseases in Massachusetts during the past forty years. From a maximum of 93 deaths per 10,000 living from these causes in the five-year period 1861-65, there had been a fall of 47.1 per 10,000 in 1895, or but little more than one-half. In 1896 there was a slight rise, to 48.1, but the returns received for the year 1897 show a considerable decrease from the preceding year. The "principal infectious and preventable

diseases" referred to are small-pox, measles, scarlet fever, diphtheria and croup, typhoid fever, cholera infantum, consumption, whooping-cough, dysentery and child-birth. During the year 18 cases of small-pox were reported, with three deaths. Of the three fatal cases one had never been vaccinated, another had been vaccinated once—in infancy, the other one was vaccinated at the time of exposure to the disease, as far as learned never before. Tabulated statistics of 330 cases of small-pox in the State for ten years, 1888-1897, with 55 deaths, show that 143 occurred in persons that had been vaccinated, of these there were 9 deaths; 149 in unvaccinated, and of these there were 38 deaths; of the vaccinated, 6.3 per cent.; of the unvaccinated, 25.5 per cent. No vaccinated child under one year old was attacked with small-pox, while 18 unvaccinated infants were attacked, and 9 of these, or 50 per cent., died of the disease. Among vaccinated children under fifteen years of age there were 20 attacks, but no deaths. Among unvaccinated children under fifteen years old there were 77 attacks and 15 deaths, or 19.5 per cent. Among vaccinated persons over fifteen years of age there were 120 cases with 9 deaths, or 7.5 per cent. Among unvaccinated persons over fifteen years of age there were 71 cases with 23 deaths, or 32.4 per cent.

"The death rate of any community from typhoid fever is a most important index of the sanitary condition of any such community." The reported cases of typhoid fever, 2,151, were less than for any year since 1892, and the fatality (21.1) was greater than that recorded in any year since 1892. The sum of the deaths from typhoid fever in Massachusetts cities in 1897 was less by 61 than that of 1896 in the same cities, and the death rate was reduced from 2.90 per 10,000 to 2.47.

Diphtheria reported during the year by 98 cities and towns, 7,856, with 1,107 deaths—14. per cent.; scarlet fever, 5,406 cases, 253 deaths—4.7 per cent.; measles, 13,705 cases, 96 deaths—0.7 per cent. The particularly encouraging feature in the prevalence of infectious diseases in the State has been the decline of diphtheria. Statistics of it are arranged in two periods, the pre-antitoxin and the antitoxin periods. The mean fatality in the former period (1891-'94) was 28.3 per cent.; in the latter (1895-'97), 16 per cent. In the latter period the board distributed 9,611 bottles of diphtheria antitoxin, representing nearly 10,000,000 units, for 953 cases, in whih the fatality was 10.4 per cent. Of 294 cases

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in which antitoxin was administered on the first day of illness there were only 13 deaths—4.4 per cent.; and of 711 cases treated in the first two days, 46 deaths—6.5 per cent.; while in 156 cases in which antitoxin was not used until the sixth day or later, there were 30 deaths—19.2 per cent.

The epidemic of cerebro-spinal meningitis during the spring of 1897, which was thoroughly elucidated and reported upon by Drs. Councilman, Mallory and Wright, has been already reviewed in these pages—preceding volume, page 88.

The work of the Bacteriological Laboratory has been extensive and of great practical utility in the diagnosis of diphtheria, tuberculosis, and in the investigation of other infectious diseases.

Offensive and noxious trades have required occasional attention, and, by the advice of the board, needful abatement secured.

Under the food and drug inspection act, 6,046 samples of milk were examined during the year, of which 31.3 per cent. was found below the standard; of 3,944 samples of other food, 12.8 per cent. was adulterated; of 690 samples of drugs, the percentage of adulteration was 35.9. There were 65 prosecutions, of which 51 were for adulteration of milk, and 64 convictions, with fines of $2,756.60.

The water supplies and sewerage—the prevention of pollution of streams and purification of sewage—have continued to occupy assiduous attention. Special investigations and advice with regard to water supply have been given in 29 cases; sewerage and sewage disposal, 21 cases; pollution of streams, in 3 cases. This subject in the aggregate—comprehending the investigations of water supplies, rainfall, flow of streams, filtration of sewage and its purification, filtration of water, sewage disposal in towns, etc.—occupies more than half of the volume. It is fruitful in knowledge of vital importance to all communities, and of great practical utility.

"Assuming that the rate of growth from 1890 to 1895 has been continued to 1896, the population for 1896 is estimated to have been 2,555,987."

Marriages, 23,651—18.5 per 1,000 of the living population; 55.2 per cent. were of native and 44.8 per cent. were of foreign birth.

Births, 72,343—28.3 per 1,000; 22,810 were of native, 34,237 of foreign, and 15,033 were of mixed percentage. Registered still-births, 2,615; of these statistics show that for the past forty years

their ratio to the total number of births, living and still-born, has been gradually increasing. Their percentage of the total number of births for the twenty years 1856-1875 was 2.54; for 1896 it was 3.49.

Deaths, 49,381—19.32 per 1,000. The statistical summaries of disease and mortality are made up of (1) the voluntary weekly mortality returns from cities and towns, serving principally to show the seasonal prevalence of each of the infectious diseases and the mortality of children under five years of age; (2) a digest of cases and deaths obtained from annual reports of local boards; (3) a critical summary of the reports of every case of "disease dangerous to the public health" which the local boards are required to report to the State Board; (4) the full reports of deaths occurring in each city and town having over 5,000 inhabitants, in accordance with the act of the Legislature, which provides that in each city and town having a population of more than 5,000 inhabitants, at least one member of said board shall be a physician, and the board shall send an annual report of the deaths in each town to the State Board of Health. Under "Health of Towns," 55 cities and towns indicate marked progress in practical sanitation. Eight cities and towns have hospitals for infectious diseases. Altogether, the report is a mine of wealth in practical sanitary methods.

MICHIGAN.—2,170,350, Nov., '98: Total deaths, 2,185; under 5 years, 422; annual death rate per 1,000, 11.6; from typhoid fever, 77; diphtheria, 47; phthisis, 170; acute respiratory diseases, 189.

Detroit, 300,000, Nov., '98: Total deaths, 323; under 5 years, 70; annual death rate per 1,000, 14.6; from typhoid fever, 2; diphtheria, 12; phthisis, 33; acute respiratory diseases, 32.

MINNESOTA.—St. Paul, 215,582, Nov., '98: Total deaths, 128; under 5 years, 37; annual death rate per 1,000, 7.1; from diphtheria, 14; phthisis, 11; acute respiratory diseases, 13.

Minneapolis, 225,602, Nov., '98: Total deaths, 136; under 5 years, 28; annual death rate per 1,000, 9.0; from typhoid fever, 6; diphtheria, 3; phthisis, 23; acute respiratory diseases, 18.

MISSOURI.—St. Louis, 623,000, Nov., '98: Total deaths, 737; under 5 years, 191; annual death rate per 1,000, 14.1; from typhoid fever, 7; diphtheria, 26; phthisis, 100; acute respiratory diseases, 136.

Kansas City, 200,000, Nov., '98: Total deaths, 169; under 5 years, 41; annual death rate per 1,000, 9.8; from typhoid fever, 5; diphtheria, 3; phthisis, 4; acute respiratory diseases, 18.

NEW JERSEY.—Newark, 235,000, 5 weeks, Dec. 31, '98: Total deaths, 445; under 5 years, 169; annual death rate per 1,000, 20.7; from typhoid fever, 3; diphtheria, 15; phthisis, 68; acute respiratory diseases, 100. The death rate for the year ending Dec. 31, 1898, was 18.30, as compared with that of 17.49 in 1897, showing an increase in the death rate of .81.

Paterson, 113,116, Nov., '98: Total deaths, 164; under 5 years, 58; annual death rate per 1,000, 14.4; from typhoid fever, 2; diphtheria, 9; phthisis, 20; acute respiratory diseases, 35. Dec. 14: Typhoid fever is again reported to be increasingly prevalent. Attributed to a particular milk supply.

Princeton (Philadelphia "Enquirer"), Dec. 15: There are several cases of diphtheretic sore throat in and about college. The faculty are employing every means in their power to isolate the sickness.

NORTH CAROLINA.—25 towns, 93,648, Nov., '98: Total deaths, 207; under 5 years, 48; annual death rate per 1,000, 13.8; from typhoid fever, 8; phthisis, 30; acute respiratory diseases, 14.

Asheville, 13,000, Nov., '98: Total deaths, 22; under 5 years, 4; annual death rate per 1,000, 20.3; from phthisis, 5; acute respiratory diseases, 1.

Charlotte, 26,153, Nov., '98: Total deaths, 28; under 5 years, 5; annual death rate per 1,000, 12.8; from diphtheria, 0; phthisis, 4; acute respiratory diseases, 3.

Raleigh, 16,000, Nov., '98: Total deaths, 23; under 5 years, 7; annual death rate per 1,000, 17.9; from phthisis, 4; acute respiratory diseases, 3.

Wilmington, 26,500, Nov., '98: Total deaths, 56; under 5 years, 13; annual death rate per 1,000, 25.3; from phthisis, 4; acute respiratory diseases, 5.

OHIO.—93 towns, 1,314,354, 9 weeks, Dec. 3, '98: Deaths from typhoid fever, 85; diphtheria, 114.

Cincinnati, 405,000, Nov., '98: Total deaths, 450; under 5 years, 83; annual death rate per 1,000, 13.3; from typhoid fever, 12; diphtheria, 7; phthisis, 51; acute respiratory diseases, 63.

Cleveland, 370,000, Nov., '98: Total deaths, 380; under 5 years, 123; annual death rate per 1,000, 12.3; from typhoid fever, 9; diphtheria, 26; phthisis, 11; acute respiratory diseases, 59.

OKLAHOMA.—Dr. Buxton, President of the Territorial Board of Health, informs the Guthrie "Leader," Dec. 23, that the Lincoln County Board of Health has declared a quarantine against Stroud on account of smallpox there. It has developed in epidemic form and every possible precaution is being taken to prevent its spread and stamp it out.

PENNSYLVANIA.—Philadelphia, 1,240,266, 4 weeks, Dec. 24, '98:

Total deaths, 1,966; under 5 years, 534; annual death rate per 1,000, 20.5; from typhoid fever, 57; diphtheria, 120; phthisis, 215; acute respiratory diseases, 368.

Pittsburg, 295,000, 5 weeks, Dec. 31, '98: Total deaths, 505; under 5 years, 174; annual death rate per 1,000, 17.7; from typhoid fever, 28; diphtheria, 9; phthisis, 30; acute respiratory diseases, 114. Jan. 10: Typhoid fever is reported increasingly prevalent. Thirteen cases reported this morning. Diphtheria is reported, Jan. 1, prevalent in Scranton, Catasauqua, and Williamson. Smallpox has gained considerable headway in Bedford. Dec. 13: Drs. F. B. Statler and H. F. Tomb, of the Board of Health, who went to Bedford to investigate the situation there, yesterday 'phoned Mayor Wagoner that there were at that time 18 cases in Bedford and vicinity. In addition there were about 1,000 cases of a peculiar form of skin disease. On investigation among ten city schools about one-third of the school children had not been vaccinated.

Youngstown (Pittsburg "Leader"), Jan. 7: The Board of Health recently ordered that all students of the public and parochial schools be vaccinated. The Board of Education refused to comply with the order and now the State Health Board has written that vaccination is not compulsory unless smallpox exists in the county.

RHODE ISLAND.—Newport Board of Health Abolished!

It is difficult to speak calmly of the action taken by the city government of Newport at its last (December) meeting of 1898. Nominally displeased at the efforts that have been none too frequent or strenuous, of the Board of Health to attempt to procure the enforcement of the city ordinances, it has deliberately abolished the board itself and substituted therefor a commission of laymen from its own two departments of Aldermen and Common Council, under the title of "Committee on Health and Sanitation." The three medical men who constituted a majority of the board were induced to consent to the change, and two of them, with a third who was a former member, have been appointed as "advisers," without vote, of the new committee.

The board for some years, indeed since its foundation, 1887, after long continued pressure upon the city authorities by the Sanitary Protective Association, has been the subject of not unkindly criticism, both by the Newport Medical Society and the Sanitary Protective Association, as shown by efforts of both these bodies to obtain for it a firmer foothold through an increased term of office for its members. These have been appointed annually, the terms of service of each ceasing simultaneously. The board has complained of not possesssing executive power, but it has been shown by one of the local court judges that its powers were amply sufficient, provided it had but chosen to exercise them. With these short terms of service the board has almost necessarily been a po-

litical one, or at least subject to political influences, and it is probably a political move that has now accomplished its downfall.

The city of Newport may be considered to have distinctly retrograded. That this retrogression will recoil upon Newport as a safe sanitary resort can hardly be doubted by any one who has a just appreciation of the intelligence of the people who have during recent years preferred it to other summer resorts.

VERMONT.—The State Board of Health is to be congratulated on the possession of a bacteriological laboratory. It was provided for at the last session of the Legislature. It is located in Burlington, and was opened for inspection by the State Board, and a reception given by the director, Dr. J. H. Lindsley, December 30.

The laboratory is a model in its arrangement. Nothing that experience, controlled by a proper degree of economy, could suggest has been spared in preparing for the important work which it is expected to perform. The rooms are well located and happily the need for additional space was supplied by neighboring rooms.

The different departments of the laboratory are accessible from three entrances. The main entrance opens into the office of the director. This room contains Dr. Lindsley's desk and the records and other papers used in connection with the work. The card system of records will be used and is already in order. By this arrangement the county divisions are used and sub-divided so that the record of an examination may be found in a moment's time and always preserved.

The room into which this office opens may be called the general room of the laboratory. In it the tuberculosis tests are made by the preparation and microscopic examination of the sputum. It is in this room also that the milk and food tests will be made. The next room reached is the receiving room, where all consignments are received, numbered, cased and sent to their respective departments for examination. Close by the receiving room is the shipping room, where the outfits, as they are called, are sent to the sixty different agents all over the State. These outfits are the properly prepared cases and vials for the reception of the substances in which the bacilli are suspected of having their existence. Among the diseases for which the examination performs the diagnosis are tuberculosis, typhoid, malaria and diphtheria. Typhoid and malaria cases are sent by mail and diphtheria and tuberculosis by express. The cases for the examination of water supplies

contain a bottle holding a gallon of the water, and properly sterilized before being sent out.

The bacteriological laboratory comes next in progressive order, and its most striking appliance is what is called a "hood," connecting with the chimney, and arranged to carry away all the objectionable odors from the process of destruction used upon the developed bacilli before they are allowed to escape. This is done by means of great heat. Thus the bacilli are sent to the laboratory, developed and cultured until they multiply and produce great families, and then are destroyed by the same agents which produced their development. The expensive incubators used in the cultures of the bacilli are in this room and make attractive pieces of furniture in the eyes of the practised scientist.

The last room of the laboratory is the chemical department, of which Assistant State Bacteriologist Dr. M. J. Wiltse has the supervision. Here are located the apparatus used in the water analyses, and their name is legion.

SOUTH CAROLINA.—Charleston, 65,165, 4 weeks, Dec. 31, '98: Total deaths, 107; under 5 years, 37; annual death rate per 1,000, 23.3; from typhoid fever, 1; phthisis, 9; acute respiratory diseases, 14.

WASHINGTON.—Seattle, 70,000, Nov., '98: Total deaths, 40; under 5 years, 8; annual death rate per 1,000, 6.8; from typhoid fever, 1; diphtheria, 4; phthisis, 2; acute respiratory diseases, 2.

WISCONSIN.—Milwaukee, 280,000, Nov., '98: Total deaths, 281; under 5 years, 104; annual death rate per 1,000, 12.2; from typhoid fever, 4; diphtheria, 12; phthisis, 19; acute respiratory diseases, 34.

CITY OF MEXICO, 344,377. For the month of November, 1898: Total mortality, 1,313; annual death rate per 1,000, 45.72; deaths from tuberculous affections, 125; acute bronchitis, 105; pneumonia, 117; bronco-pneumonia, 35; pulmonary congestion, 34; typhus fever, 26; diarrhœa enteritis, 242; infantile diarrhœa, 13.

BUENOS AYRES, 758,678, Oct., '98: Total deaths, 1,209; under 5 years, 482; annual death rate per 1,000, 40.37; from typhus, 11; diphtheria, 118; phthisis, 150; acute respiratory diseases, 213.

SMALLPOX in the United States, in 1898, as reported to the Surgeon General, United States Marine Hospital Service (Public Reports, Dec. 30), 3,649 cases, with 213 deaths. The statistics

show that it appeared in every State and Territory in the Union, but with an exceedingly small mortality. There were 428 cases among the Mexicans in the vicinity of Las Cruces between June and Dec. 9, and 166 deaths. At Deming there were 25 cases reported and many others isolated in the surrounding country. There were 52 at Albuquerque and vicinity between March 5 and Sept. 4.

Mortality statistics abroad for the third quarter, 1898. Population, total mortality, annual death rate per 1,000 of population, deaths from typhoid fever, diphtheria, diarrhœal diseases, consumption.

London, 4,504,766; 21,762; 19.6; 122; 366; 1,733. Glasgow, 724,349; 3,595; 19.8; 53; 32; —. Liverpool, 633,645; 4,056; 25.5; 42; 32; —. Manchester, 539,079; 3,243; 24.0; 12; 15; —. Birmingham, 510,343; 2,690; 21.0; 18; 27; —. Leeds, 416,618; 2,139; 20.5; 12; 59; —. Sheffield, 356,478; 2,114; 23.7; 20; 5; —. Dublin, 349,594; 2,118; 24.1; 39; 12; 268. Bristol, 316,900; 1,313; 16.5; 5; 10; —. Belfast, 304,610; 1,886; 24.7; 238; 11; 247. Edinburgh, 295,628; 1,376; 18.6; 7; 16; 127. Nottingham, 236,137; 1,032; 17.4; 10; 3; —. Bradford, 233,737; 1,054; 18.0; 7; 8; —. Hull, 229,887; 1,243; 21.6; 13; 2; —. Newcastle, 223,021; 1,328; 23.8; 17; 5; —. Salford, 215,702; 1,545; 28.6; 16; 3; —. Leicester, 208,662; 970; 18.6; 7; 8; —. Portsmouth, 186,618; 803; 17.2; 10; 9; —. Cardiff, 177,770; 703; 15.8; 7; 17; —. Brighton, 122,310; 549; 17.9; 4; 4; —. Norwich, 111,669; 567; 20.3; 9; —; —. Plymouth, 99,136; 499; 20.1; 2; 2; —. Brussels, 551,014; 3,206; 16.7; 38; 11; 215. Amsterdam, 503,045; 2,228; 17.6; 12; 9; 200. Rotterdam, 298,433; 1,391; 18.6; 14; 7; —. La Haye, 196,325; 955; 19.5; 2; 12; —. Paris, 2,511,629; 11,854; 19.0; 64; 38; 2,095. Lyons, 466,028; 2,259; 19.4; 43; 10; 276. Lille, 219,529; 1,384; 25.2; 6; 2; 164. Saint-Etienne, 135,784; 737; 21.7; 12; 6; 96. Roubaix, 124,447; 636; 20.4; 2; 1; 63. Le Havre, 119,470; 933; 31.2; 12; 1; 123. Rouen, 114,817; 946; 33.0; 12; 1; 124. Nice, 114,121; 419; 14.7; 20; 3, 47. Reims, 107,709; 818; 30.3; 19; 1; 67. Berlin, 1,728,201; 8,503; 49.6; 28; 125; 795. Hamburg, 661,015; 3,378; 20.3; 13; 30; 231. Munich, 430,000; 2,906; 27.0; 2; 44; 345; Leipzig, 422,097; 2,682; 25.5; 5; 43; 209. Breslau, 392,795; 2,553; 26.0; 7; 13; 280. Dresden, 377,500; 2,014; 21.3; 3; 17; 247. Cologne, 340,000; 2,583; 30.5; 7; 29; 149. Frankfort, 244,808; 1,048; 17.1; —; 3; 119. Hanover, 227,660; 1,270; 22.2; 6; 1; 92. Magdeburg, 220,722; 1,600; 29.0; 3; 6; 98. Dusseldorf, 192,518; 1,266; 26.2; 1; 7; 78. Kœnigsberg, 178,821; 1,171; 26.2; 18; 10; 66. Nuremberg, 172,941; 1,271; 29.4; 4; 14; 160. Chemnitz, 172,417; 1,278; 29.6; 3; 7; 82. Altona, 161,886; 767; 18.9; 2; 1; 63. Charlottenburg, 161,062; 678; 16.8; 5; 18; 45. Stettin, 154,233; 1,173; 30.4; 44; 10; 54. Stuttgart, 149,943; 699; 18.7; 3; 3; 66. Bremen, 147,339; 640; 17.3; 2; —; 81. Elberfeld, 146,281; 748; 20.4; 2; 3; 64. Strassburg,

142,885; 865; 24.2; 5; 5; 77. Barmen, 132,598; 681; 20.6; 1; 7; 60. Aix-la-Chapelle, 131,364; 921; 28.0; 4; 5; 58. Dantzig, 128,325; 813; 25.4; 5; 15; 47. Halle, 123,755; 943; 30.5; 6; 12; 58. Brunswick, 122,718; 666; 21.7; 3; —; 60. Crefeld, 108,211; 589; 21.7; 3; 4; 51. Metz, 59,143; 320; 21.6; 7; 1; 36. Berne, 54,578; 229; 16.8; —; 4; 33. Bale, 94,646; 403; 17.0; 5; 1; 43. Geneve, 87,926; 368; 16.7; 3; 1; 80. Lausanne, 41,655; 141; 13.5; —; 3; 23. Zurich, 158,504; 593; 14.9; 5; 4; 68. Vienna, 1,574,129; 7,353; 18.4; 29; 83; 1,162. Buda-Pesth, 648,104; 3,629; 22.5; 32; 43; 489. Prague, 377,109; 1,643; 17.4; 22; 19; 262. Triest, 164,491; 1,256; 30.5; 25; 15; 150. Lemberg, 139,094; 895; 25.7; 8; 12; 182. Gratz, 122,350; 779; 25.5; 2; 7; 150. Brunn, 102,509; 62; 24.4; 7; 4; 110. Copenhagen, 340,500; 1,402; 16.4; 19; 14; 164. Stockholm, 274,611; 1,141; 16.7; 4; 40; 152. Gothembourg, 117,350; 357; 12.2; 1; 2; 82. Christiania, 203,324; 706; 13.9; 3; 6; 118. St. Petersburg, 1,132,677; 6,714; 23.5; 274; 252; 804. Moscow, 988,614; 8,263; 33.0; 126; 148; 681. Odessa, 383,000; 2,565; 25.6; 46; 27; 191. Venice, 167,074; 892; 21.3; 44; 7; 90. Madrid, 491,595; 3,766; 30.5; 90; 48; 414. Bilbao, 60,956; 570; 34.0; 41; 4; 61. Jassy, 70,065; 678; 38.7; 16; 7; 60.

For the second quarter, 1898.—Bordeaux, 256,906; 1,257; 19.6; 10; 6; 133. Mannheim, 104,182; 537; 20.6; 3; 3; 85. Debreczin, 60,700; 456; 30.0; 1; 2; 45. Presbourg, 52,800; 466; 35.3; —; 7; 84. Helsingfors, 79,454; 375; 18.9; 1; —; 63. Rouen, 489,965; 1,962; 16.1; 14; 12; 192. Milan, 464,819; 2,362; 20.3; 35; 31; 250. Turin, 353,424; 1,504; 17.0; 15; 15; 182. Genes, 218,209; 1,056; 19.3; 25; 5; 119. Florence, 196,865; 857; 17.4; 4; 6; 101. Bologne, 152,042; 689; 18.1; 4; 4; 60. Brescia, 70,737; 456; 25.8; 5; 10; —. Madrid, 491,595; 3,726; 30.2; 50; 36; 400. Jassy, 70,065; 614; 35.1; 6; 4; 50. Le Caire, 534,677; 5,931; 44.5; 345; 47; 343. Alexandria, 273,653; 2,112; 30.8; 45; 2; 193. Damiette, 31,285; 182; 23.2; 4; —; 6. Suez et Ismalia, 19,526; 158; 32.4; —; —; 12. Port Said, 30,773; 178; 23.1; 1; —; 10. Baltimore, 506,398; 2,585; 20.4; 27; 62; 258. Rio de Janeiro, 750,000; 4,317; 22.9; 32; 4; 628. Buenos Ayres, 738,484; 2,924; 15.8; 66; 44; 310. Mexico, 344,377; 5,829; 67.6; 194; 19; 373. Montevideo, 244,839; 897; 14.3; 28; 8; 84. St. Louis de Potosi, 68,097; 869; 51.0; 9; 9; 34. Bombay, 821,764; 10,256; 50.2; 4,039; —; —.

For the first quarter, 1898.—Marseilles, 447,344; 2,917; 26.0; 32; 25; 191. Bordeaux, 256,906; 1,682; 26.2; 6; 9; 127. Rouen, 114,817; 742; 25.8; 9; 1; 154. Amiens, 88,734; 519; 23.4; 3; 3; 55. Limoges, 77,703; 606; 31.2; —; 5; 96. Grenoble, 63,805; 383; 24.0; 1; 1; 33. Saint Quentin, 48,689; 261; 21.4; —; 4; 32. Utrecht, 98,434; 479; 19.4; 4; 1; 47. Groeningue, 63,824; 312; 19.5; 1; 2; 41. Maestricht, 34,125; 173; 20.3; —; 1; 20. Barme, 132,598; 613; 18.5; 6; 11; 71. Porto, 171,467; 1,303; 30.4; 16; 5; 155. Algiers, 96,642; 642; 26.6; 6; 7; 69. Rio de Janeiro, 750,000; 4,096; 21.7; 27; 1; 652.

BOOK REVIEWS.

THE SEXUAL INSTINCT—ITS USE AND DANGERS, AS AFFECTING HEREDITY AND MORALS—ESSENTIALS TO THE WELFARE OF THE INDIVIDUAL AND THE FUTURE OF THE RACE. By JAMES FOSTER SCOTT, B. A. (Yale University), M. D., C. M. (Edinburgh University); late Obstetrician to Columbia Hospital for Women, and Lying-in Asylum, Washington, D. C.; late Vice-President of the Medical Association of the District of Columbia, etc., etc.

"If it is possible to perfect mankind, the means of doing so will be found in the medical sciences."—DESCARTES.

Pp. 436. Price, $2.00. New York: E. B. Treat & Co.

Prefatorily, the author states that "this book contains much plain talking, intended primarily and mainly for laymen—not for women or boys"—for which he offers no defence. Its justification will be found in the body of the work. To see men give rein to their animal passions, subjecting themselves and others to so many risks of which they are ignorant, is intensely saddening.

"Jeremy Taylor says: 'It is impossible to make people understand their ignorance, for it requires knowledge to perceive it; and, therefore, he that can perceive it hath it not.'

"The design of this work is to furnish the non-professional man with a thorough knowledge of matters pertaining to the sexual sphere—knowledge which he cannot afford to be without. I have endeavored to convey this knowledge in language free as far as possible from technical terms and intelligible to laymen. My endeavor has been to avoid generalization, vagueness and indefiniteness—to truthfully present physical and ethical facts—not evading unpleasant topics, nor yet transgressing the limits of propriety."

In fairness to himself, he states that his knowledge of these subjects has been acquired through legitimate channels. "Upon my very entrance into university life my attention was first directed to the subject by an address from the late President Porter of Yale University; then came the experience as a medical student at Edinburgh, Vienna and London; then a resident for two and a half years in a hospital devoted exclusively to obstetrics and the diseases of women, followed by several years more of hospital and private practice."

On this basis, the author proceeds to upturn the hitherto too much forbidden ground in sociological literature.

The scope of the work is well indicated by the author's own synopsis in the first chapter:

Self-preservation and the sexual instinct the two chief impulses which govern human action—Importance of rightly comprehending the sexual side of one's nature—sin luxuriates in ignorance and secrecy—Enemies of posterity—Fatherhood and justice to offspring—Character chiefly developed during developmental period—Laws of nature and morality coincide—The grave responsibilities incurred in the lustful life—Children of the vigorous tend to survive, while the progeny of the vicious tend to become eliminated—Nature leisurely in punishing—No pardon granted for sins against the body—The aftermath of lust which physicians see—No animal so bad as some men—Perfect continence compatible with health—Self-control and altruism—Pure glow of the sexual functions is the well-spring of all the majestic qualities of man—Impairment of sexual vigor a terrible calamity—Ethical defect associated with vitiation of it—Danger for every uninstructed man—Conscience, duty and sympathy racial instincts—Heredity, the past at work in the present—Progeny of the impure, sons and daughters tend to have a surcharge of erotic inclination.

The author expresses himself forcibly from substantial knowledge gained from other sources besides his own extensive observation, and uses it freely. "Even the skeptic," he well says, "who entertains the belief that after death there is no judgment to come, must pause to consider when he is reminded that there is, after all, such a thing as sin." And here follows an apt quotation from "The Pathology of the Mind," by Mandsley:

"Blinded by the conception of sin as an offence against a supernatural power, it has been impossible for the individual to see that sin is foolishness in the natural world, and to realize his responsibility for being sin's fool. If it were desired to heed a degenerate human being, sinful, vicious, criminal, or insane, what would be the safest recipe? To engage his progenitors in an anti-physiological or anti-social life; to impregnate them thoroughly with alcohol or with hypocrisy, with syphilis or with selfishness, with gluttony or with guile, with extreme lust of the flesh or an extreme pride of life. When mankind has learned the ways by which degenerate beings have come to be, it will be able to lay down rules to prevent their production in time to come; but in order to do that it must substitute for the notion of *sin* and its consequences in a life to come after death the notion of *fault* of or-

ganic manufacture and the consequences from generation to generation in the life that now is—must not rest satisfied to look outside nature for supernatural inspirations, divine or diabolic, but seek for natural inspirations within itself which it can observe, study and manage."

Altogether, it is the best presentation of practical knowledge essential to the highest development of the human organism hitherto published, and a substantial contribution to the promotion of health in its every aspect.

PROCEEDINGS OF THE THIRTEENTH ANNUAL MEETING OF THE CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEALTH OF NORTH AMERICA, DETROIT, MICH., AUGUST 10, 1898.

Twenty-one States were represented. In accordance with the prearranged programme, replies were called for from the representatives severally to these questions:

What are the Principal Lines of Work of Your Board? How is Each Accomplished? What Modification, if any, Does the Experience of Your State Suggest?

The leading lines of work were: The organization of local boards of health; accurate registration of vital statistics; protection of the water supplies, and the restriction of infectious diseases. The chief obstacles to the accomplishment of these purposes are defective legislation, obtuseness and parsimony of the local authorities. The local officers are generally the supreme authority in their towns, and when the powers of the State sanitary authorities are advisory only, as they too commonly are, with reference to some of the most needful conditions in conflict with the public health, sanitary progress is oftentimes dangerously slow. For example: "The work of the State Board of Health of Rhode Island is purely advisory. It has no mandatory powers except in the control of State quarantine in the presence of an epidemic, but is able to accomplish much in sanitary work through the power of the official name. * * * The word 'may' is often more effective in obtaining a change of opinion than the most exacting demand of law. Freedom in civil and religious liberty is the character of existence, and it has been recently demonstrated in the decision of the Supreme Court of the State by allowing the free operation of Christian Scientists, this body being considered as not coming under the term 'practice of medicine,' notwithstanding the fact that they assume the care, or rather neglect, of all forms

of illness, including the care of the mother and child in confinement"! In virtue of the same fallacy in legislative enactments and judicial decisions, the State sanitary authorities generally find great difficulty in protecting the people from small-pox.

The most encouraging advance in sanitary work during recent years is the protection of the water supplies and school sanitation. These subjects have very generally engaged the attention of all of the State Boards. Of the Gulf States, however, quarantine has been the well-nigh absorbing subject. But little attention has been given to anything else, and even that service was greatly lacking in representation at the Conference.

SAJOUS ANNUAL—ANNUAL AND ANALYTICAL CYCLOPÆDIA OF PRACTICAL MEDICINE, BY CHAS. E. DE M. SAJOUS, M. D., and one hundred Associate Editors, assisted by Corresponding Editors, Collaborators and Correspondents. Illustrated with chromo-lithograph engravings and maps. Vol. II. Royal octavo. Pp. 607. Bromide of Ethyl to Diphtheria. Philadelphia, New York, Chicago: The F. A. Davis Co., Publishers.

This volume presents the sum of medical literature, by excerpt, in continuation from volume one, up to May 1, 1898, together with exceptionally valuable articles on a number of the most important subjects that have engaged the attention and research of the best medical thought for the period. Of these, especially worthy of mention, are: "Cerebral Hæmorrhage," by Dr. William Browning; "Cirrhosis of the Liver," by Prof. Adami; "Cholera," by Prof. Rubino; "Cholelithiasis," by Prof. Graham; "Diabetes," by Prof. Lépine; "Diphtheria," by Drs. Northrup and Bovaird; "Catalepsy," by Prof. Eskridge; "Cholera," by Prof. Boudurant; "Cacainomania," by D. Norman Kerr; "Cataract," by Dr. Oliver; "Constipation," by Prof. N. S. Davis; "Dilation of the Heart," by Dr. Vickery; "Deaf-Mutism," by Dr. Holger Mygind.

The work is gotten up in the excellent style common to the publishers, and altogether is a work well-nigh indispensable to physicians who would be abreast with professional advancement.

HARPER'S PICTORIAL HISTORY OF THE WAR WITH SPAIN promises to be a complete encyclopædic panorama, covering all the causes, facts and results of the short, sharp, decisive, vastly momentous war of 1898. No other conflict of arms in the world's history has been so picturesque, so full of dramatic action and of kaleidoscopic changes. And this pre-eminence of the pictorial

belongs not only to the immediate movement of the war itself, and the gorgeous background of its tropical scenery, but also to that accumulation of tragic and pathetic events that led up to the acute issue, and to the vivid tableaux that marked the beginning and progress to the end. Of no other war can it be so truly said as of this, that in the telling of the story the pen of the writer must leave a vivid picture on the brain of the reader, the pencil of the delineator must weave into the context a web of lights and shadows that might almost tell the story themselves.

CONTEMPORARY LITERATURE.

THE RED CROSS IN THE WAR.

The grand total of gifts from all parts of the world, including supplies and transportation, was not less than $3,000,000, and probably not more than $4,000,000, although the agents in different States say it is very difficult to value the supplies.

No such munificence was ever known before in the history of the world. Though the war is practically over, the Red Cross keeps up its good work, and will, as far as it can, bend its energies to ameliorating the condition of the Cubans. In Porto Rico little or nothing remains to be done, and in the Philippines there will be no great need of charitable action; but in the luckless island of Cuba a very large body of people will require assistance for two or three years before they become prosperous and self-supporting. Not alone are the fields ruined, but the homes, factories, machinery and live stock have been destroyed.

Many of the nurses, doctors and agents who served during the war underwent great privation and suffered severely from hunger, thirst, fever and malarial diseases. Two of the women nurses died and several have returned with their constitutions impaired, if not ruined, by the deadly climate and the vile surroundings of the Cuban cities. The heroic Red Cross army has a long roster, and it seems invidious to single out a few of the workers. Miss Barton proved herself an indefatigable executive, and Dr. Lesser and Sister Bettina were skillful and faithful medical directors. Mrs. John Addison Porter, wife of the secretary of President McKinley; Miss Adele Gardiner, a New York belle; Miss Annie Wheeler, Miss Margaret Chanler, and Miss Isabelle K. Rutty, an English college woman, made noble records for themselves which

will never be forgotten by this generation.—From "The Red Cross in the Spanish War," by Margherita Arlina Hamm, in the "American Monthly Review of Reviews" for January.

INSANITY'S DEBT TO MEDICAL SCIENCE.

Insanity is now recognized as a disease which is the result of some functional or organic disturbance of the brain, or of some injury or malformation of that organ. Be it said to the everlasting credit of medical science that it has rescued the whole subject of the diseases of the brain and nervous system from the region of myth and superstition, and placed it on a scientific plane along with the other diseases and injuries to which human flesh is heir. The old lunatic asylums, and the filthy cells of the county jails with all their horrors, where the victims of dethroned reason used to be confined and tortured, have been abolished, and in their place we now have the modern hospital for the insane. And it stands on the same footing in every respect as a hospital for diseases of the eye and ear, or any other medical specialty. It was not the churches, but medical science, inspired by a desire to benefit mankind, which taught the world that the insane are our brothers still, and that to them is due the same Christian charity and care as to any others in distress.—From "Theology and Insanity," by Dr. John Girdner, in "North American Review" for January.

EYE-MINDEDNESS AND EAR-MINDEDNESS.

I wish to call especial attention to the fact that it is only late in the history of the race that language has passed to its written form. Man is indeed now a reading and writing animal, but only recently has he become so. It is only since the invention of printing and the wide dissemination of books, magazines and newspapers that reading has become a real determining factor in the life of the people. Even now the human organism is engaged in adapting itself to the new strain brought upon the eyes and fingers in reading and writing. We can understand, therefore, that it will demand a considerable maturity in the child before he is ready for that which has developed so late in the history of the race. The language of the child, like that of the primitive man, is the language of the ear and tongue. The child is a talking and hearing animal. He is ear-minded. There has been in the history of civilization a steady development toward the preponderating use of the higher senses, culminating with the eye. The average adult

civilized man is now strongly eye-minded, but it is necessary to go back only to the time of the ancient Greeks to find a decided relative ear-mindedness. Few laboratory researches have been made upon the relative rapidity of development of the special senses in children, but such as have been made tend to confirm the indications of the "culture epochs" theory, and to show that the auditory centres develop earlier than the visual.—From "Should Children Under Ten Learn to Read and Write?" by Prof. G. T. W. Patrick, in "Appletons' Popular Science Monthly" for January.

GREAT WORKS OF ART UNEARTHED BY ACCIDENT.

Writing of statues worth their weight in gold, in the January "St. Nicholas," Mr. E. H. House says:

"Several of the finest ancient sculptures have been discovered by pure accident, in comparatively recent times. The famous Apollo Belvedere, now in the Vatican, was brought to light only about four hundred years ago, at Antium, where many art treasures of the Roman rulers were once stored. The group of the Laocoon was dug from the ruins of the baths of the Emperor Titus, and the stately Venus of Milo, or Melos, lay hidden and forgotten for centuries, in an island of the Mediterranean, before it was found by a lucky chance. Undoubtedly there are plenty more of equal value under Italian and Grecian ground, if people only knew where to look."

DIFFICULTIES IN THE WAY OF PURE SPORT.

Amateur sport is burdened with innumerable definitions, and the end of rule-making is not yet. A half-dozen broad principles applied fairly and lived up to honestly would answer the purpose.

The point is, however, that the value of an athletic law, the beneficial influence it exerts in any given institution, depends very largely upon the spirit with which it is enforced. More than that, there is a spirit in every law of college sport which the letter cannot always develop, and yet which breathes the real intent of the letter and the doctrine of sport for sport's sake.

What but the spirit of the law have we to depend on for arousing in the undergraduate mind the sentiment of sport for its own sake? If faculty committees misconceive and misinterpret this spirit, we cannot be surprised if those less responsible show tendencies to evade the letter. And how shall we judge of the manner in which that spirit is conceived and interpreted except through

the personnel of athletic teams? Where shall we find more tangible expression of the faculty's view of sport than in the character of the football or baseball team? The athletic rules of a university convey to me the least conviction of its real attitude. But show me the football team, and I will quickly discover the spirit of sport that obtains at that institution. The stringency of the letter of the law is of no significance; it is the spirit with which it is enforced that indicates the true tone of the athletic government, and that stands revealed, ninety-nine out of every one hundred times, in the personnel of the teams. The exception comes, it is true, but it is seen rarely; at all other times the spirit of sport as conceived by the faculty is faithfully reflected in the character of the teams.—"Harper's Weekly."

THE CARE OF THE HANDS.

In frosty weather, particularly if dark clothes are worn, the hands very soon become soiled, and require frequent washing. They should be washed in warm water, not hot water, and, if possible, in soft water. After washing they should be dried very thoroughly in bran or oatmeal, and great care taken that the nails are most thoroughly dry; in the drying the cuticle can be pushed back sufficiently to show the half-moon at the base of the nail. Nail-scissors, not used for any other purpose, should be used to cut off any hangnails; but it is better to use a file to keep the nail short, and for this purpose there should be three or four files of varying size. To give the lustre desired there is a new kind of wash that makes the nails pink, not deep red, and also gives a gloss and finish. After this is put on the hands should be washed, but sufficient of the polish will remain.

After the hands are washed the second time to remove the polish the nails should be rubbed briskly, either with a piece of chamois, a nail-polisher, or by rubbing them again with the palm of the hand. This last method is perhaps the best of all, for it polishes just enough without giving too exaggerated a finish in appearance.

Rings are so much the fashion that the hands must of necessity be well kept, but it is a mistake to wear too many rings, particularly with a plain gown; it is to be hoped that it will soon go out of fashion to wear them with anything but evening dress.—"Harper's Bazar."

LITERATURE, published by Harper & Brothers, makes the welcome announcement of a new poem by England's chosen bard—Rudyard Kipling. The poem is "Kitchener's School," and, as the title implies, sings the future of the lands round about Khartoum under English rule. "Kitchener's School" might well be included among the uncrowned laureate's "Songs of the English," and it will rank with the best work the poet has done. It is full of the same inspiration that breathes in "The Recessional," and is another great and striking example of Kipling's original conception of the mission of the English nation and her way of dealing with conquered peoples. Two verses are sufficient to show the nature of the poem:

> They do not consider the Meaning of Things;
> They consult not creed or clan;
> Behold, they clap the slave on the back,
> And, behold! he becometh a man.
>
> They terribly carpet the earth with dead,
> And before their cannon cool,
> They walk unarmed by twos and threes,
> To call the living to school.

HARPER'S FOR JANUARY is especially valuable by reason of note worthy contributions to political criticism, important estimates of contemporary men and events, and interesting descriptions of regions of the world that have lately been brought into prominent notice. Among the most prominent features are: "Bismarck the Man and the Statesman," a personal estimate of the Iron Chancellor, by Charlton T. Lewis; "The Sultan at Home," by Sidney Whitman, F. R. G. S., illustrated by Harry Fenn; and "A Glimpse at Nubia, miscalled the Soudan," by Capt. T. C. S. Speedy, illustrated from the author's photographs, by R. Caton Woodville. The number opens with an accurate and interesting account of "The Naval Campaign of 1898 in the West Indies," by Lieutenant S. A. Staunton, U. S. N., illustrated by Carlton T. Chapman. Henry Loomis Nelson contributes a timely and instructive criticism entitled "The Weakness of the Executive Power in a Democracy," as illustrated in our late war. Other articles of great value and contemporary interest are "Brother Jonathan's Colonies," by Professor Albert Bushnell Hart, and "Fifty Years of Francis Joseph," by Sydney Brooks.

THE JANUARY CENTURY.—Miss Cecilia Beaux, easily first among American women artists, and one of the strongest portrait-painters of the day, has made a striking head of Admiral Sampson, from life, which appears as the frontispiece. This is apropos of the second instalment of Lieutenant Hobson's "Merrimac" papers, in which the sinking of the collier, as directed by the Admiral, is vividly but modestly described by the hand that did it. The account is of absorbing interest, and of itself would make this number of the magazine remarkable. Capt. Sigsbee of the Maine continues his personal account of the episode that precipitated the conflict with Spain; and Mr. Edmond Kelly describes the experiences of "An American in Madrid During the War." But the interest of the magazine is by no means exclusively military, despite these three articles and the continuation of Prof. Wheeler's "Alexander the Great." There is much that breathes of peace. "The Carlyles in Scotland" is an intimately personal paper; and equally readable in another way is Miss Florence Hotchkiss' "Carlyle's Dramatic Portrayal of Character"—the prize essay in "The Century's" College Competition. Mr. F. Marion Crawford, in "Via Crucis," continues his fascinating romance of the Middle Ages; and Mr. Paul L. Ford's "Many-Sided Franklin" is devoted this month to the great man's schooling and self-culture, his services to education, and his library. Mr. Herford's "Child's Primer of Natural History," the third instalment of which appears this month, bids fair to become a classic in its kind.

THE LIVING AGE FOR THE NEW YEAR presents several features of striking interest. The number for January 7 contains, among other things, a pungent and wholesome lecture on "Art and Morality," by M. Ferdinand Brunetiere, which is translated for the magazine and copyrighted by it; the first instalment of "The Etchingham Letters," which are attracting wide notice in "The Cornhill" by their cleverness; and the beginning of a short serial. The number for January 14 gives the full text of Lord Rosebery's recent address on "Literary Statesmen," which has been the subject of general comment; an article from "Blackwood's" on "The Ethics of Conquest," which relates to the Philippines; and a bright paper on "The Madness of Mr. Kipling."

THE SANITARIAN.

MARCH, 1899.

NUMBER 353.

PREVENTION OF CONSUMPTION.

The now leading thought of progressive sanitarians is the prevention of consumption. And the most encouraging sign of the times in this regard is the vigor with which the proposition is supported by the most intelligent and influential personages. A meeting was recently held at the Marlborough House, under the presidency of the Prince of Wales, to further the objects of the National Association for the Prevention of Consumption. At the invitation of His Royal Highness, there were present the Marquis of Salisbury, the Earl of Rosebery, the Earl of Derby, Lord James of Hereford, the Chief Rabbi, the Lord Provost of Edinburgh, Mr. McKinnon Wood (chairman of the London County Council), the Director-General of the Army Medical Department, the Director-General of the Medical Department of the Navy, the president of the British Medical Association, the presidents of the Royal Colleges of Physicians, London, Edinburgh and Ireland, Sir William Priestly, Sir James Sawyer, Sir James Crichton Browne, Mr. James Knowles, Mr. Hulse, Sir George Brown, Sir Ernest Clarke, Canon Rawnsley and other distinguished men.

The most important speech was delivered by the chairman of the association, Sir WILLIAM BROADBENT, who said:

We learn from the returns of the Registrar-General that nearly 60,000 deaths are every year registered as due to tuberculosis in England and Wales alone, and to this number may be added a considerable percentage of the deaths set down to acute affections of the lungs, in which tubercle has played an unrecognized part. Of these over 40,000 are from consumption, 6,000 from tuberculous disease of the intestines and mesenteric glands, and 6,500 from

tubercular meningitis. The destructive work of tubercle does not end here. Five thousand five hundred deaths are attributed to other forms of tuberculosis, among which are diseases of the bones. Humpback, hip-joint disease, disease of the knee, ankle, elbow, wrist and other joints, which cripple or disable so many children, are the sign manual of tubercle. This terrible waste of life, with all the protracted suffering attending it, and the distress, moral and material, which it involves, is in great measure preventable. Already, by the effects of subsoil drainage, by improved hygiene, by the higher general standard of comfort and cleanliness, by greater attention to ventilation and to the construction of dwellings, the number of deaths from consumption and other forms of tuberculosis has been reduced by more than 50 per cent. in fifty years. The single sad exception to this statement is that tabes mesenterica, the disease of the bowels in children traceable to tubercle conveyed by milk, has increased. But, while sanitary improvements have so far reduced the mortality from tuberculous diseases, science has pointed out the way by which these ravages may not only be directly mitigated, but directly prevented.

It is now definitely known that consumption is a contagious disease; that it is communicated from person to person, and from animal to man; and that it arises in no other way. It is not an inherited vice in the constitution which declares itself in course of time; but, while some constitutions are more prone to it than others, and while an unhealthy mode of life and unwholesome surroundings predispose to its attacks, every case of consumption is derived from some pre-existing case. Phthisis, with all the various forms of tuberculous disease, is the work of a microbe—the tubercle bacillus discovered by Koch. This living organism is present in countless millions in the diseased lungs or intestines or bones. By its multiplication it blocks the minute blood vessels, chokes the air vesicles, and destroys structures, and by a poison or toxin which it forms it gives rise to febrile disturbance, nocturnal perspirations and wasting. It is by the transmission of these bacilli that tuberculous diseases of all kinds are spread. The principal way in which they are conveyed from a diseased to a healthy person is by means of the expectoration, which contains them in enormous numbers, and which when dried is suspended in the atmosphere, especially of ill-ventilated rooms, in the form of dust, and inhaled. Happily, they are not present in

the breath of the consumptive patient, so that consumption is not contracted merely by breathing the same air or living in the same house with a sufferer. Another way in which the bacilli are disseminated is in milk. Cows, unfortunately, are very subject to tuberculosis, and sooner or later the bacilli find their way into the milk. Through milk so contaminated infants and young children become affected with tabes mesenterica, tubercular meningitis and disease of the bones. The flesh of diseased animals also may contain the bacilli. If we could ensure the destruction of all the sputa of the sufferers from phthisis, and secure a supply of milk and meat absolutely free from tubercle bacilli, all the diseases due to tuberculosis, which now cause one-seventh or one-eighth of the total number of deaths, would cease from the land.

These facts are generally known throughout the medical profession, and the precautions based upon them will be inculcated by the medical attendant. But the adoption of the necessary measures would, as we know from abundant experience, be very slow, and would require many years; and if 70,000 persons die every year from tuberculous disease, which for Great Britain and Ireland is a very moderate computation, at least 200 new persons must catch the disease every day. It is the realization of this fact which has called into existence the National Association for the Prevention of Consumption and other Forms of Tuberculosis. The mission of the association is to carry into every dwelling in the land an elementary knowledge of the modes in which consumption is propagated and of the means by which its spread may be prevented, and thus to strengthen the hands of medical men throughout the country who are dealing with individual cases of this disease. To this end the public attention must be captured, the public imagination must be impressed, the defensive instincts of the general public must be aroused; and we do not hesitate to express our belief that your Royal Highness will, by the single gracious act of calling together and presiding over this meeting, save thousands of lives. The objects of the association can be stated in a few words. They are (1) to educate the public as to the means of preventing the spread of consumption from those already suffering from the disease; (2) to extinguish tuberculosis in cattle; (3) to promote the erection of sanatoria for the open-air treatment of tuberculous disease. It is only necessary here to indicate the spirit in which the operations of the society will be conducted. While making known the contagious character of

consumption, it will endeavor to allay the panic which arises in some minds when it is known that consumption is catching. It does not advocate the compulsory notification of consumption, but it will urge upon sanitary authorities the desirability of insisting on the

DISINFECTION

of rooms in which consumptive persons have died, when notification of the fact is made through the certificate of death. Its method is instruction and persuasion, not compulsion. In particular it will seek to enlist the co-operation of the sufferers themselves, and when the victim of consumption understands that, by observing the precautions recommended by the association, he (or she) is protecting family and friends from the disease, he will be careful to carry them out. On the other hand, the friends and relatives of sufferers and the public generally will in self-defence discourage and repress the filthy and unnecessary habit of expectoration in public vehicles and places of public resort; and we may expect railway companies and others to follow the example set in America of putting up notices pointing out the danger of the practice. So, again, with regard to milk. The society recognizes the fact that it is impracticable to stamp out tuberculosis by the immediate slaughter of all diseased animals, but it will insist that the public has a right to a milk supply which shall be absolutely free from tubercle bacilli, and shall not scatter death among the children of all classes of the community. It will earnestly advocate the testing of herds by tuberculin and the isolation of animals found to be affected—a method which has been attended with conspicuous success in Denmark—and it will urge upon district and county councils and all rural and urban authorities the supervision of cattle-sheds and of dairy farms, and of all the agencies for the distribution of milk. Another important matter upon which it has already memorialized the London County Council is the provision of

PUBLIC SLAUGHTER-HOUSES,

where the inspection of carcasses can be carried out before the evidence of disease has been removed. Until tuberculosis is eradicated from among our cattle an indispensable precaution is to boil or sterilize all milk, especially that given to children. The sterilization of milk is an easy and simple process, and it ought to be done at home. Sterilization on a large scale at the dairy is open to abuse, and it may be so carried out as to impair the nutri-

tive qualities of the milk. The third great object of the association is the promotion of the erection of sanatoria for the open-air treatment of consumption and tuberculous diseases generally. It aims not only at prevention, but cure. The isolation and cure of those suffering is, however, the very best and most efficient preventive measure, since a consumptive patient once lodged in a sanatorium ceases to be a focus from which the disease spreads. Your Royal Highness has visited Falkenstein, and can bear witness to the provision there made for the open-air treatment of phthisis, and of the success which attends it. Your Royal Highness may, therefore, well reproach us for lagging behind Germany in a matter of such importance. America also is in advance of this country, but it is only lately that the medical profession here has been convinced that the open-air treatment of consumption could be successfully carried out in this country. We have thought it necessary to send our patients on long voyages, or to the south of France, or to the germ-free atmosphere of the high Alps, originally recommended by Dr. Hermann Weber—one of the pioneers in the hygienic treatment of consumption, who is here as a guest of your Royal Highness to-day. Now, however, experience gained in such diverse parts of the country as Edinburgh, Norfolk and Ireland, to say nothing of the different winter resorts on the south coast, has demonstrated that most satisfactory results can be obtained at home. The chance of recovery, formerly the privilege of the favored few, is thus open to all classes of the community. The association, therefore, will advocate

THE ERECTION OF SANATORIA

for every large center of population. The Poor Law authorities will sooner or later find that it is more economical to provide sanatoria where tuberculous paupers may recover than to send them to infirmaries to die. Municipalities will consider it their duty to defend the populations over whose interests they watch from consumption, as they now do from fever, by the erection of sanatoria; and, above and before all, the charitable public generally, and those whose sympathies are drawn toward sufferers from consumption by having lost parents, children, or brothers, or sisters, or friends from this disease, will seize the opportunity of doing more for them than merely to smooth their passage to the tomb. Meanwhile a beginning is to be made in London by a self-supporting sanatorium, which will minister to the needs of the class which lies between the rich and the poor. The London partners of

Messrs. Wernher and Beit have undertaken to erect and equip such a sanatorium at an estimated expense of £20,000, the construction and management of which will be under the guidance of the association. As at Falkenstein, any excess of income over expenditure will be devoted in the first instance to the payment of a small interest (2½ per cent.) on the capital, and the balance to such purposes in connection with the objects of the association as may be determined by the committee. This offer has been a great encouragement to the organizing committee, and we know that many benevolent persons are ready and waiting to come forward to supplement it by making provision for the poor. The idea which animates the association is that the prevention of consumption is a national duty, in which the medical profession and the public can co-operate, the medical profession leading and guiding the movement. The organizing committee have every reason to congratulate themselves on the interest which has been excited in all parts of the country. Branches are being formed in York, Norwich, Ipswich, Huddersfield, and other towns, and at York a considerable sum of money has already been raised for the erection of sanatorium. An impetus will be given to the work of the association by the meeting here to-day, under the presidency of your Royal Highness, which will greatly expedite its success in dealing with the gigantic task it has undertaken.

THE CONSUMPTIVE POOR.

There is an opportunity which I want to speak of for us as citizens, as individuals interested in the welfare of our community, to do good in a most practical and noble way, not only to the consumptive poor, but indirectly to the whole community. Let us for a moment leave our pleasant homes, with all their comforts, luxuries and beautiful surroundings, and visit the crowded tenement district of one of our large cities. Here, thronging the narrow, filthy sidewalks, are men ignorant and heedless of the value of cleanliness; women and children clothed in rags; in short, types of the very lowest grades of existence. Dilapidated tenements are numerous. Fresh air is scanty. Sunlight enters but a small portion of the rooms. Is it a wonder that sickness ravages in such places; that consumption spreads its germs among relatives, friends and neighbors, until finally the whole community is more or less infected? None of us wonder that such is the case. We

all know the danger of the spread of tuberculosis when it is not properly cared for; and yet I venture to say, as shown from the actual state of affairs existing at the present time, that but few are really aware of the great evils resulting in regard to consumption and consumptives. This leads me, therefore, to ask you to consider with me the most beneficent and practicable method of caring for the consumptive poor.

There are, of course, a few small private institutions for the care of consumptives here and there in the United States; but my plea is one which concerns the public at large, viz., to have State institutions erected in the immediate vicinity of our large cities. And these State institutions, which I shall term "Sanatoria," are to be so constructed and managed as "to prevent all the hopeless cases of consumption from communicating the disease to the large number of susceptible individuals with whom they now come in contact; and to give the consumptive patient yet in the early stages of the disease the best possible chance of becoming a well man and a useful citizen." (1) And further, such sanatoria are to be purposely for people of limited means, of the strictly so-called "dispensary class," "who need the housing, food and care that they are unable to purchase." (2) Institutions of this kind, I maintain, would be the most beneficial and practicable means of caring for the consumptive poor of our large cities. And I shall try to make this proposition clear by showing first that the general hospitals are not suitable for consumptives; secondly, that the open treatment of consumption at the various health resorts is neither practicable nor justifiable; and, thirdly, that there is no objection against the sanatoria, but in fact every reason in favor of their establishment.

First, then, in speaking of the general hospital, let us suppose that through some special effort of friends, or other means, a bed is procured in one of the general municipal hospitals for a person found in the last stages of consumption. Immediately a most important question arises: is the general hospital suitable for such patients? Here it is that we have persons suffering mainly from acute diseases. Suppose, for instance, a person sick with pleurisy, with acute indigestion, or any disease which causes a low bodily condition, is occupying one of the general wards, are we doing justice to such patients in not separating them from the bacillus of the tuberculous ones?

According to the best authorities on the treatment of consumption, such a custom is full of risk and is condemned. (1) There

are no special wards for consumptives in our municipal hospitals, and the consumptives are mixed indiscriminately with the other patients, who consequently must become exposed to the danger of infection. This being the case, I again appeal to you in behalf of all our worthy sick poor; are we doing right to tolerate such a method of caring for them—a method so heedless in principle that it aims not at the protection and welfare of all concerned?

But the danger to other patients is not the only wrong that results from the treatment of consumption in the general hospital. For just as the consumptive endangers other patients at the hospital, and, as we have seen, likewise endangers his friends and others in remaining at home, so, too, if we examine the case which a consumptive himself has in the general hospital, we shall find—although doubtless to the great astonishment of many—that even he is but little better off in such a hospital than in his own home.

Let us consider for a moment the most essential factors, according to the best authorities, (2) in the cure of consumption. They are: Fresh, pure air, sunlight, special nourishment and judicious exercise. Fresh, pure air, then, is recognized as a most essential factor in the cure of consumption, and yet the patient in the hospital is almost as much deprived of fresh, pure air as he would be in his own home. And if he should ask, day or night, to have a window open, "his rheumatic neighbor would very strenuously object, for he could not stand the draught." (1) Secondly, as to sunlight, the patients should take a regular amount of rest in the open air on a piazza in the sunlight; and also should take exercise in walking, which exercise should be regulated according to the condition of the patient. Then, too, pulmonary gymnastics, either in the form of ordinary calisthenics or of the pneumatic cabinet, when given regularly and with care, have a markedly beneficial effect upon the expansion of the chest. (2.)

But there are no such pains taken for the consumptive at the general hospital; even respiratory exercises are but rarely recommended, for the physician knows they are useless in the ordinary hospital atmosphere. (1.)

Now we have brought to our attention three main factors for the cure of consumption—fresh, pure air, sunlight, and judicious exercise—which cannot possibly be realized at the general hospital. But further and finally, the physicians of the general hospitals, both from the lack of means of obtaining the best remedies for the treatment of consumption, and from their differences in opin-

ion as to the value of medication in this disease, do not give the patients a special diet and the most uniform treatment.

Once more I ask you to recall the poor consumptives in their own nasty, filthy homes, growing worse day by day, and continually disseminating their poisonous germs to other members of the community. Once more I ask you to think of the poor hospital consumptives who cannot have even the fresh air which they so much crave, to say nothing of all the other most important factors for the treatment of the disease. And here again I ask you to think whether you would like to have a worn-out, rheumatic friend lying by his bedside exposed to the deadly tuberculous dust which the consumptive is continually expectorating.

While you bear in mind these thoughts, I want to call your attention to the second and only other common public method of caring for the consumptive poor, viz., the so-called "open-air" treatment at the various health resorts, as at Aiken, at Asheville, in Southern California, etc. But this method need not take much of your attention, for you can easily see that it is not a practical one for the needy class of patients, both on account of the expense necessary to convey them to and fro, and also because only those who are expected to benefit from the change are sent to these places. Neither is such a method justifiable with our present knowledge of the contagiousness of the disease, for "there are many people who resort thither simply for a change or for other maladies than phthisis—and then there are the inhabitants themselves of these places—who are to be protected from the danger of contagion." "Already hotel proprietors are recognizing this fact and are closing their doors to consumptives." (3.) Furthermore, "there is danger to the public in traveling on the roads much frequented by pulmonary invalids." (4.)

If, then, the open-air treatment at health resorts is too expensive for the very poor, and if only those who are expected to recover can have such treatment, we encounter at once a most serious obstacle, for it is the needy poor whom we are especially considering, and not only one, but all consumptives, rich or poor, should have proper care. The fact that all consumptives cannot have proper care through such resources is itself a sufficient reason for adopting some other method. But when there is—in addition to this fact—plainly danger to the traveling public, and when the hotel-keepers of these health resorts are already shutting the doors to the consumptives from the fear of infecting their other guests, is

it not high time that we as worthy citizens should recognize that the question of taking some other care for the poor consumptives is one of vital importance?

The general hospital is—I repeat—wholly unfit for consumptives. But there is yet a practicable solution of the question, and I feel positive that if the public fully understood the true situation of affairs, the method would soon become general and most beneficial. I refer, as I mentioned in the beginning, to a provision for State institutions, or sanatoria, for the consumptive poor; and this method I shall ask you to consider under three heads—first, as to the care of the patients; second, as to the welfare and safety of the public; and third, as to the economic and educative gains which would result from such institutions. There are in Germany over thirty sanatoria for the consumptive poor, either in working order or in the course of construction, and most of them are under municipal control. (5) A study of these institutions yields most favorable results, and I shall make use of them in making clear to you their superior advantages. First of all, since I have just protested against the one-sided view of the climatic treatment, I want to be clearly understood that I am in no sense depreciating the value of climate (6), only I desire to see it properly used and in a most advantageous way for all concerned.

And now in introducing the sanatoria to you and showing you first the direct advantages to the consumptives themselves, I want to consider one especial misconception regarding the institutions. If you suggest sanatoria to some persons they will fairly shudder at the idea of being shut up with so many consumptives; but this attitude of mind comes from the erroneous conception of a sanatorium, and ignorance of the life within it. (6) The atmosphere in these institutions, on the contrary, is a cheerful one, as all who have been to them will agree; (6) and "the patients are generally happy and contented." (6) "The repose of mind engendered in a sanatorium is most helpful. The patient is made to feel that he is wasting no opportunity, and, what is of inestimable value to a sick man, he is encouraged to give himself up entirely to the guidance of the physician and renounce all responsibility of his case. He is only to follow out from day to day the routine of life which is arranged for him—to do blindly, so to speak, what is told him to do, like school children or athletes training for a contest—a most favorable condition of mind for improvement and recovery." (6) And, moreover, consider for a moment the treatment which

the patients receive in contrast to that in the general hospitals: There are "the best possible hygienic conditions; protection from a new infection, either by self-infection or from some other careless patient; good nourishment, with a wholesome, abundant, varied and attractively served table—the food being especially prepared when the conditions demand it; facilities for proper physical exercise and massage;" (6) plenty of fresh air, and the very best and most uniform medical treatment.

As to the second point of view from which to regard the sanatoria, viz., the welfare and safety of the public, some persons contend that they would be a source of danger to the community; but this contention is wholly groundless, for we have abundant evidence that there is no danger of infection from properly regulated institutions. Says Dr. V. Y. Bowditch, of Boston, in a paper presented at a meeting of the American Climatological Association at Lakewood, Vt., in May, 1896: "I wish to refute the statements that properly regulated consumptives' hospitals are sources of danger to the community, when I believe them to be exactly the opposite, as shown by statistics." Says Knopf: "Well-conducted sanatoriums for consumptives are not centres of infection; but, on the contrary, places where the tuberculous patient is the most free from the danger of self-infection, and where there is the least chance of his communicating his malady to others." (7) And, finally, as Dr. Otis says: "It is fair to presume that if such hospitals were a menace to the neighborhood they would hardly be permitted to be established or remain." But such is not the case, for "at Gobersdorf and Falkenstein, in Germany, where are two of the oldest and largest sanatoria, the mortality from consumption among the inhabitants has diminished;" (7) and "there are existing in thickly settled centres many hospitals for consumptives in Europe—Switzerland, Germany, France and other countries." (7) Hence it must be clear that this objection is entirely without weight and that properly constructed sanatoria are not a source of danger in a community.

Lastly, as to the economic and educative gains which would result from such institutions: "Ultimately the State has to provide refuge in its general hospitals, poorhouses and asylums for the consumptive when he is too ill to work longer. Here he is both 'a menace to the other inmates, and receives little, if any, special treatment, although the expense per capita is probably larger than it would be in a special hospital. The favorable results are, more-

over, almost nothing, while with the special treatment in sanatoria many lives would be restored to the working community.' (3.) That this latter fact could be depended upon is shown by the results obtained at the institutions now existing in Europe. (1) (3.) Then, too, the educative influence is worth noticing. The patient after being trained in proper methods of personal hygiene, on entering common life again, may not only be able so to care for himself as to prevent a repetition of the disease, but by precept and example show others how to avoid the conditions conducive to phthisis." (6.) Also—and this is by no means of slight importance—"the educative value on the side of its material for clinical study, and its laboratory for the investigation of problems in tuberculosis" must be thought of. "Many therapeutic problems, the testing of the value of any vaunted drug or method of treatment, can find in such an institution most favorable conditions for their solution." (6.)

Now then, after presenting to you this greatest of relief problems among the sick poor, both from the point of view of the sick themselves and with due regard to the other members of the community as well, I ask you in conclusion to remember the fact that an undue proportion of the population are dying yearly from this terrible disease; that although consumption is an infectious disease, it is not necessarily incurable under proper treatment; that the general hospitals on account of the nature of the disease are not adapted to the care of tuberculous patients; and that the open-air treatment at the various health resorts is, broadly considered, neither practicable nor justifiable.

What, then, are we as citizens—eager for the best means of protecting the welfare of our community—to do?

Shall we remain heedless to such a tremendous evil that surrounds us on all sides, when we know that other countries have their consumptives properly cared for in sanatoria, where the best facilities for the treatment of the disease can be had, and where the danger to the public is reduced to a minimum?—"Boston Transcript," January 21, 1899.

Hail Good Dardanian fields bestow,
At whose command Pæonian waters flow;
Unpurchased HEALTH! that dost thy aid impart
Both to the Patient and the Doctor's art!

—*Claudian.*

HISTORY AND PROGRESS OF SANITATION OF THE CITY OF WASHINGTON, AND THE EFFORTS OF THE MEDICAL PROFESSION IN RELATION THERETO.*

By Samuel C. Busey, M. D., LL. D., President of the Medical Society of the District of Columbia.

When Washington, March 29, 1791, made a tour of inspection to mark the metes and bounds of the site selected for the location of the Federal city, the territory comprised, in whole or in part, the farm lands of nineteen proprietors. The area of 6,100 acres was irregularly cut across by numerous farm roads for the convenience of those residing within its limits. There was but one roadway running through the entire area from Georgetown to the eastern branch, but neither its course, beginning nor terminus is stated.

With a single exception the farm dwellings and the outbuildings were constructed of wood. Many of the dwellings were capacious buildings, and known as mansion houses, denoting the home, wealth and social standing of the proprietor. Near by each one of the stately mansions was located the family graveyard. The mansion house of Notley Young was built of brick, and the cottage of David Burnes was "a long, one-story frame." Many of the outbuildings, barns, tenements and slave houses were built of logs.

The city site was bounded on three sides by streams of fresh flowing water. The eastern border was swept along a bold shore by the Anacostia, varying in depth from four and a half to six and a half fathoms of water, offering an opportunity for a safe harbor for a naval and mercantile marine and sufficiently capacious for an extensive commerce. The southern boundary was washed by the rapid current of the Potomac from its deep water at the mouth of Rock creek to its junction with the Anacostia. Rock creek on the west then, as now, flowed through a deep ravine around the horseshoe bend to its outlet into the Potomac. It was then a picturesque

*Address at the sixth annual meeting of the Washington Academy of Sciences, December 14, 1898.

stream of unpolluted water, but is now an open sluiceway for the sewage of one, and until recently, of both of the neighboring cities, not less offensive to observation than conducive to the production of mephitic emanations.

In addition to the boundary water courses, there were several creeks into which numerous spring streams emptied along their way through the territory. The three headwater branches of the Tiber, with sources at elevations varying from 115 feet and 7 inches to 236 feet and 7 inches above the level of the tide, one of which finds its beginning in the grounds of the Soldiers' Home, penetrated the northern boundary line at different points between Vermont and New York avenues. At or near the latter point they united in a common stream, which flowed along a valley in a southwest direction, reaching the elevation of tide water in a depression between Capitol Hill and Judiciary Square, crossing Pennsylvania avenue at Second street west to B street south, and thence by an abrupt change in its course to its mouth at the foot of Seventeeth street west.

Its watershed covered hundreds of acres, extending from Fourteenth street west far into the eastern section. Its banks were originally covered with trees and underwood of different varieties, and formed a romantic stream, which was overspread in spring and autumn with wild ducks, and penetrated as far up as Pennsylvania avenue, with multitudes of shad, herring, pike, perch and other food fishes. One of the largest tributaries, now concealed by improvements, crossed Pennsylvania avenue between Ninth and Tenth streets west, having its source in the springs in Franklin Square.

Rights Reserved.

So much of the territory was wood land that the original proprietors reserved the ownership of the timber, except such as might be reserved by the President, which was to be paid for "at a just and reasonable valuation." Some of the forests covered large areas of land. Many smaller tracts and spaces were occupied by clusters, groves and clumps of forest trees. Other larger and smaller areas were covered with shrub oak, alder and thorn bushes and grape vines. Mr. Wells, who assisted in the original survey of the city, says "that at times more than half of the territory included within its limits was covered with woods and swamps."

The swampy lowlands spread out in many acres, south of the F street ridge to the river shore, along the valleys of St. James creek

and the Tiber, including a greater part of the White Lot and the mall, which for the most part were covered with swampy growths and bramble and waukapin bushes. But the largest continuous area of morass and swamps was the section known as the Slashes, lying along the northern boundary line from the Tiber to Rock creek, dipping in many places far into the interior of the basin.

Around this great geological basin, with its plateaus of moorlands and lowlands; its farm lands and morasses; hills, valleys and ravines; springs, streams and drainage courses, there was a range of wooded heights, extending from the Potomac on the east, to Little river on the west, with elevations varying from 200 to 420 feet above the level of the tide, and broken only by the creeks that penetrated its territory and the rivers that washed its shore lines to unite at its base in one great river that flowed through the gap to the bay. Along its course of irregular elevations, the many fields of view seem to rival each other in the grandeur, diversity and expanse of prospect that "marked the breadth of the picture, and the strong colors in the grand and environing wall of forest heights, which rolled back against the sky, as if to inclose a noble area of landscape, fit for the supreme deliberations of a continental nation."

Natural and Topographical Defects.

It must be clear to every sanitarian that the contour and physical conditions of the floor of the basin were such as to unfit the site for the location of the capital of a great empire, and nothing less than the genius of L'Enfant, evolved under the direction and supervision of Washington, could have devised a plan that would overcome the natural and topographical obstacles and defects, and be developed into a city as grand and beautiful in all of its appointments as now stands upon the site.

The reclamation of Pennsylvania avenue was the first effort at street improvement, and perhaps notes the first attempt at sanitation. When first laid out that part between Fifteenth street west and the foot of Capitol Hill was a boggy morass, covered with bramble bushes and subject to tidal inundations and storm water overflow. It was the habitation of game, venomous reptiles and pestiferous insects, and forbidden to man and beast. Soon after the beginning of the foundations of the Capitol, in 1793, its improvement was set on foot by carting earth, gravel and chips of stone, first to make footways, and then to fill up and level the centre, until a rough roadway was incompletely prepared. This

method of improvement was continued until by the act of Congress of April 24, 1801, $10,000, "to be reimbursed by the sale of lots," was appropriated "for footways to be made for the convenience of Congress."

Congress Takes Action.

In 1830 a committee of the House of Representatives was appointed "to inquire into the expediency of making provision by act of Congress or otherwise for the improvement and repair of the street in Washington City called the Pennsylvania avenue, from the President's house to the Capitol, on the McAdam plan, or other permanent manner." In its report the committee pronounced the street "neither safe nor convenient," and declared it to be a public highway, the improvement of which was necessary "to provide a safe and convenient road of communication, . . . not merely for the convenience of the citizens of the District of Columbia, but for members of Congress, the various and numerous officers of the General Government residing in this District, and the citizens of the States who may have business to transact with Congress and these officers." The improvement, in accordance with the plan of the committee, to pave the space between the middle rows of trees with "sizable round stone" or macadamize with "pounded stone" and cover the other parts "six inches deep with clean coarse gravel," completed the reclamation of a large area of low and swampy land, enhanced the value of property, encouraged the erection of buildings along its course and supplied sidewalks for the pleasure and convenience of members of Congress, but only to a limited extent, if at all, improved the surface drainage. During the succeeding decades (1830 to 1850) the avenue was several times improved by regrading and repaving with cobblestones (by relaying of brick sidewalks and curbing), and since by paving, in sucession, with wood blocks, concrete and asphalt.

The mutilation of the scheme of the "grand canal" by authority of the acts of Congress of May 1, 1802, and February 9, 1809, and other subsequent supplemental and amendatory acts, granting to the "Washington Canal Company" a charter to construct for commercial purposes a canal along the courses of the Tiber and St. James creek through the territory from the foot of Seventeenth street west to the Anacostia river at the foot of Second street east, was the first enterprise materially affecting the drainage of the city. Through this waterway the storm and subsoil waters of a large area found outlet to the river. By authority of an act ap-

proved January 31, 1831, the city purchased this canal and continued its use for commercial purposes. Prior to 1871 all the sewers constructed by the city emptied into it, and as it flowed through a greater part of its course along a natural valley line it became the trunk drain for the central section of the city. With lessened use as a business enterprise and continuously increasing accumulation of filth it became such a nuisance, offensive alike to sight and smell, and such a menace to health, that its obliteration by filling, begun in 1871, was completed in 1880,

The construction of the B street and Tiber sewers, emptying respectively into the Potomac and Anacostia rivers, which filled its place as drain and filth carriers, was a substantial advance in the sanitation of the city.

Street Improvement.

During the long period between the reclamation of Pennsylvania avenue and its improvement according to the plan of the committee of the House of Representatives street improvement was either stationary or so slow and unsatisfactory that citizens grew weary in futile efforts to obtain passable roadways for business purposes through the central and most populous section of the city. A few streets were year by year rudely prepared by filling the low places along their courses, setting curbstones, laying sidewalks, paving gutters along the curb lines and covering the carriageways with a few inches of gravel. In very many instances such improvements so obstructed the natural drainage courses that large areas of private property were submerged.

The introduction of Potomac water in 1859 marks an important epoch in the history of sanitation of the city. Previous to that time the drinking-water supply was obtained from springs, pumps, wells, and, in a few instances, from private reservoirs of rain water collected from roofs. There is no record of any measurements of the level of the ground water in any part of the city, but from observation of the depth of wells and other sources it can be approximately stated to vary in different localities from a few feet to greater depths in higher localities. The larger and smaller areas of porous soil must, therefore, have been constantly subject to capillary filtration, even to saturation, according to seasons, the amount of precipitation and the volume of water in the principal drainage channels. The geological character of the basin naturally favors soil pollution from the seepage of the many thousands of cesspools and other makeshifts, and finally leaky and defective

sewer and house drains. Soil pollution means, of course, water pollution of all the shallow and many deep wells which have recently been drilled in the hope of securing a purer water supply.

Sewer Construction Begun.

Sewer construction was begun in 1810 by an appropriation made by the city government of $120, to erect "an arch on the south side of Pennsylvania avenue between Ninth and Tenth streets." During the period extending from that date to 1871 numerous sums were appropriated, mostly after the introduction of Potomac water, by the city and general governments, which were expended in the construction of sewers, with a few isolated exceptions, in that part of the city lying south of M street north and between Third and Seventeenth streets west. These sewers were designed to carry storm water, subsoil water and liquid sewage to the canal. The Franklin Square stream was the main trunk line, which in the beginning was only arched at street crossings, but it is now completely concealed by extension of the arching and erection of buildings over it along its entire course.

By the act of Congress approved February 21, 1871 (entitled "An act to provide a government for the District of Columbia"), known as the "territorial government act," a "Board of Public Works" was created, which established the beginning of important and comprehensive sanitary improvements, consisting in the adoption of a general system of opening, regulating and grading of the streets and of their improvement by pavement with stone, wood block and concrete, widening, laying and relaying of sidewalks, arching of running streams, decoration of parks and spaces, reclamation of low lands, drainage of swamps, compulsory filling and draining of submerged lots, squares and larger areas, extension of the water supply, and construction of a system of sewerage, which, however, was "planned and built only where the rapid increase of population, and consequently of its waste water, made underground removal necessary at the time, without consideration of ultimate requirements."

In 1874, after about eighty miles of sewers, mostly of pipes, had been constructed, the Board of Public Works was abolished and the government of the District was placed under the management of a board of three non-resident commissioners, who continued the general and extensive plan of improvements, originated and prosecuted with energy at great cost by the Board of Public Works.

Some Grave Mistakes.

Notwithstanding the great progress of the sanitation of the city, especially in the abatement of many nuisances, and the transference of others to points remote from the populous parts of the city, during the regime of the Board of Public Works and its immediate successor, many grave mistakes were made, the correction of which has required, and will continue to require, large additional expenditures "to bring the sewerage system up to the standard of modern sanitary engineering." Among the many defects were faulty construction, insufficient capacity to carry the storm waters, "absence of slope, and therefore of scouring velocities," imperfect soil, drainage and ventilation, construction of pipe sewers with loose and imperfect connections, permitting their construction by roots of trees, the building of James Creek canal, which soon became, as it is to-day, an open channel of festering accumulation of filth, and the failure "to discharge the sewage into the channel of the river, or arranging to do so later." The discharge of sewage into "the canal at such elevations as to preclude its being carried into the rver by sewers having a free discharge at high tide, created such a dangerous nuisance by the continual accumulation" of sewage deposit as to necessitate the filling of the canal and the construction of the Tiber creek and B street sewers. The construction of these large sewers with insufficient grade admits the entrance of tide water, causing retardation of the flow of the sewage to a distance of two miles from the eastern branch in the Tiber creek, and one and a half miles from the river, in the B street sewer, and has resulted in accumulations of deposits reaching several inches in depth and thousands of feet in length. Then again the sewerage from the B street outlet found lodgment upon the Potomac flats, to the detriment of the health of the general public, and causing such continual increase of disease that the community at large remonstrated against the delay in efforts to reclaim these flats.

Under the act approved June 11, 1878, the government of the city was placed under the management of three commissioners, one of whom must be an engineer officer of the United States Army, to have charge of the engineering work. With the creation of this form of government began the work of the highest scientific skill upon the broadest lines of modern sanitary engineering, which, with the passage of the bond bill of 1894, would have advanced the progress of sanitation in this city beyond that of any

city in this country. Faulty work, with unfit material and obstructed sewers, have been replaced with better material, in more durable manner. Outfalls have been improved. Storm water, intercepting and trunk line sewers have been constructed. Many defects have been corrected and the nuisances created by such mistakes have been finally abated.

Sanitary Engineers Appointed.

Under the provision of the act of Congress of March 2, 1889, entitled "An act making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June 30, 1890," the President was authorized to appoint three sanitary engineers charged with the duty of examining the system of sewerage of the District and to report with such suggestions and recommendations as might to them seem necessary or desirable for the modification and extension of the same. Their report comprehends the problems of a system of sewerage, drainage and sewage disposal in an unobjectionable manner, together with the prevention of inconveniences and damage from heavy rain storms and freshets in the Potomac river which have caused frequent inundations of the low areas in the central part of the city. Recently the improvements and extensions have been made in conformity to the recommendations set forth in that report.

When the city was laid out there were no river flats. At an early date, how early does not appear, there were discovered large areas of shoal water between the channels of the Potomac river, one between the middle and city channels, extending from a point opposite Twenty-fifth street to Tenth street west, and a large area between the middle and Virginia channels, extending from about the same point opposite the foot of Twenty-fifth street west to Greenleaf's point, which increased by continuous deposition and finally became one large area of exposed surface covered with a luxuriant growth of succulent and noxious weeds, to rot and stink in the nostrils of a suffering community. Popular judgment ascribed the formation of these flats to the construction of the Analostan causeway in 1805 and the building of the Long bridge in 1808. It may be that these structures did promote the development of the flats and obliteration of the middle channel, but the early maps (1732-80) of the city and river front mark the areas of shoal water corresponding with the location of the flats. Fortunately these flats have been reclaimed into an area of 621.12 acres of park land, which in time to come will add beauty to the water front and contribute to the pleasure of the citizens.

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Extension of Marshy Area.

L'Enfant, in 1791, measured the Anacostia river at the point where the Benning bridge is now located, to the depth of four and a half fathoms of water. At that time the current was along the western shore to its mouth. The existing extensive area of flats must therefore be a later formation, probably finding its cause in the building of the bridge at the foot of Kentucky avenue in 1795, and the Benning bridge in 1797. How much the construction of the northeast boundary intercepting sewer, completed in 1885, has contributed to the rapid extension of the marshy area since that date cannot be determined beyond the belief that it has been such a potential factor in promoting the extension of the nuisance as to necessitate the construction of an intercepting sewer along the western shore of the river to the foot of New Jersey avenue, which will carry the contents of the Boundary intercepting sewer to deeper water and a more rapid current. Congress during the last session made an appropriation for a preliminary survey, with the view to begin the reclamation of the Anacostia flats.

So much for drainage and sewerage sanitation. There is, however, another phase of municipal hygiene and preventive medicine. I refer especially to the activities of the medical profession in determining and eradicating the causes of preventable diseases. In the earlier decades there does not seem to have been any organized effort, not even in protest against legislation creating and extending nuisances detrimental to health, much less in promotion of sanitary reforms. It is true in 1797, in a population of 2,000, but seven deaths occurred in this city. During succeeding decades, however, fatal epidemics of "bilious fever," "intermittent bilious fever" and "bilious dysentery" prevailed at intervals of one, two and three years, and of smallpox at longer intervals. In 1797 inoculation was first practised in this city, and in 1801 vaccination was introduced by President Jefferson. In 1832 the first and only invasion of Asiatic cholera occurred.

First Effort of Sanitation.

The first organized effort at sanitation was the appointment in 1819 of a health officer charged with the duties of reporting to the mayor "all nuisances . . . which might endanger the health of the citizens; all sources of diseases, prevailing epidemics and contagious diseases," with recommendations of means "to remove the evils, restrain their progress and prevent their recurrence and to keep a correct register of deaths." In 1822 this office was

abolished by the establishment of a board of health, composed of one physician and one layman from each of the six wards into which the city was then divided. To this board was granted the additional power to formulate a code of regulations, regarding the preservation or restoration of the health of the city, particularly in regard to pestilential or contagious diseases. With powers limited to the adoption of resolutions and submission of recommendations to the mayor, without the authority to enforce any declaration or condemnation of a nuisance, but little if any progress was made in sanitation, until the cholera invasion in 1832, when the board asserted its authority in the establishment of hospitals under its direct and exclusive control, together with the adoption of such regulations as seemed best to limit the prevalence of the epidemic. During subsequent years it seemed to have occupied itself mainly in futile efforts to establish a hospital, until 1844, when through its influence the Washington City Infirmary, the first public general hospital in this city, was opened for the reception of patients. In 1846 Dr. Henry Huntt was succeeded in the presidency of the board by Dr. Thomas Miller, who, as the saying goes, took the bit in his mouth and asserted with untiring persistence and vigor the province of a board of health with sufficient authority to enforce its mandates. Additional powers were, year by year, granted by the City Council, as it sought to extend and execute its authority. The scope of its usefulness was enlarged, with power to condemn and abate as well as to declare nuisances detrimental to health, to make and enforce regulations for the registration of vital statistics and to provide medical care for the indigent sick at their homes.

After the retirement of Dr. Miller, the board continued to discharge its duties along the line laid out by him, but with less activity, until its reorganization and transformation, by the act of Congress of February 21, 1871, into a political body composed of three physicians and two laymen, which occupied itself for the most part in wrangling to the amusement of newspaper reporters and chagrin of good citizens. It did, however, formulate some health ordinances of practical value, which remain in force to-day.

The Health Department.

The abolition of this board and creation of a health department under the direction of a health officer, by the act of Congress of June 11, 1878, marks the beginning of an important era in the history of sanitation of the city. The humdrum course of the health department through a series of years failed to awaken public in-

terest, and not until the Medical Society of the District of Columbia asserted its prerogative in all matters pertaining to the preservation of health and the appointment in 1894 of the present health officer did the department assume the full measure of its responsibilities, and rise to the high standard of intelligent and active discharge of its duties to the public at large. It must, however, be stated that since the installation of the present form of government in 1878, the Board of Commissioners has, with commendable energy, prosecuted many measures of municipal sanitation, and in recent years coöperated in every movement to promote and extend the scope of preventive medicine in this city.

In 1894 the society adopted and transmitted to Congress the report of its committee appointed to investigate the causes of the undue prevalence of typhoid fever in this city, which set forth the conclusions of the society and certain recommendations.

These conclusions were reaffirmed a year later by Dr. George M. Kober, special medical sanitary inspector, in the report of his "investigation of 500 cases of typhoid fever, selected at random from those occurring in the District of Columbia between July 1 and October 31, 1895." Again, in 1896, the society formulated and transmitted to Congress the propositions, which embody a complete and final statement of its recommendations in regard to the subjects to which they relate.

Some of the recommendations made have been made effective by later legislation, and others are as far advanced in course of accomplishment as the time elapsed since the enactment of the necessary laws will permit, with favorable results, as shown by the diminution of the number of pumps to 123, and compulsory connections of houses with the systems of water supply and sewage disposal, to the number of 1,748 (June 30, 1898), but more distinctively by the extension of the water mains to 346.74 miles, and of sewers to 382.83 miles, to June 30, 1898, and a consequent reduction of the death rate of typhoid fever.

Comparative Illustration.

To demonstrate more completely the beneficent effects of sanitary reforms, the following comparative illustration may be cited. In 1870 the cities of Berlin and Washington were alike in primitive and objectionable methods of sanitation. Without an adequate water supply, the larger part of their populations was dependent for drinking water upon public and private wells. Without systems of sewerage, both were alike supplied with makeshifts

for the disposal of human excreta, foul water and house sewage. The unpaved streets were the common receptacles of garbage and refuse, and along the gutters the surface and house drainage were conducted to the neighboring water courses. Since the city of Berlin began the system of sanitary improvement, completed in 1890, at the cost of 59,000,000 marks for a pure and ample water supply, and 4,500,000 for construction of sewers, the death rate of typhoid fever has fallen from 143 in 1872 to 4 in 1894 per 100,000 of its inhabitants. Mark the difference, however, that our typhoid fever rate is still twelve times greater than that of Berlin, a condition entirely due to the fact that the German capital has a pure supply of filtered water, while we are compelled to have recourse to water from the Potomac river, in which pollution has been established beyond a question of doubt.

In the foregoing résumé of the history of sanitation of this city, covering a period of 107 years, I have given credit where credit is due. Many incidents, circumstances and data have been omitted, but the record is sufficiently full to show the magnitude of the work accomplished, and in progress, to the end that with the completion of the system of sewage disposal and adequate extension and purification of the water supply, this city will be among the foremost of the most favored cities of the world, in all that pertains to the prevention of avoidable diseases.

PROOF OF A YORKSHIRE MAN.—A lad, seeing a gentleman in a public house eating eggs, said:

"Be so good, sir, as to give me a little salt."

"Salt, for what?"

"Perhaps, sir, you'll ask me to eat an egg, and I should like to be ready."

"What country are you from, my lad?"

"I's Yorkshire, sir."

"I thought so. Well, there, take your egg."

"Thank you, sir."

"Well, they are great horse stealers in your country, are not they?"

"Yes, my father, though an honest man, would think no more of taking a horse than I would of drinking your glass of ale," taking it off.

"Yes, I see you are Yorkshire."

HYGIENIC CAMPS.*

By H. R. Hopkins, M. D., Prof. of Hygiene, University of Buffalo, N. Y.

In the war of the Crimea, with 1,460,500 troops, there were killed in battle 53,870; died of wounds, 66,600; died of disease, 492,200. In the American war of 1861-5, in the northern army, there took the field 2,336,000 troops, there were killed in battle 44,-240; there died of wounds, 34,006; there died from disease 149,-240.

In the American-Spanish war there took the field 274,717 troops; there were killed in battle, 293; there were wounded, 1,577; there died from disease, 2,619.

In the American war of 1861-5, there died from camp diseases, diarrhœa, dysentery and camp fevers, 85,214.

The report of the United States Commissioner of Pensions in 1898 shows upon the pension roll 993,714. The United States government has disbursed for pensions since the war of 1865 $2,-327,525,237. In 1880 the bacillus of typhoid fever was discovered by Eberth. In the same year Sternberg discovered the pneumococcus of pneumonia. In 1882 Koch discovered the bacillus of tuberculosis; in 1884 the bacillus of cholera. In the same year Loeffler discovered the bacillus of diphtheria. In 1892 Canon and Pfeiffer discovered the bacillus of influenza and the supposed bacillus of measles.

It is the common knowledge of all informed men that from the earliest times the fatality attending camp life is far in excess of that attending the march or line of battle. There has been no exception to this experience. If it were not that there has come into the minds of sanitarians within the last thirty years something which is important and new, there might possibly be criticism as to the expediency of discussing this question at this time, but within the last thirty years, since the civil war, discoveries have been made as to the nature of the communicable diseases, discoveries which are of such an important character that the subject of the

* Abstract of paper read at the meeting of the Medical Society of the State of N. Y., January 31, 1899.

communication of these diseases needs to be restated and discussed anew, in so far as their prevention in camp is concerned.

Prior to thirty years ago we had opinions as to how diphtheria was communicated, and in regard to the spread of dysentery, but we had nothing but opinions, and our practice was of the vague and uncertain character which always attends action when that action is guided simply by opinion. But the labors of the microscopist and bacteriologist have replaced these opinions with more solid scientific material, which produces in the mind conviction, a very different affair. We now know positively how typhoid fever is communicated; we know accurately how diphtheria is communicated, and for that reason it is proper that we should discuss the question of hygienic camps.

Permit me a single moment as to the trend such discussions should take. It would seem that the time has passed when the philosophy of the hygienic camp should be discussed, and I do not propose spending time to discuss it. The time has come when we should concentrate our efforts upon the consideration of the means of demonstrated value which may be put into operation in military life to produce those conditions of health for which they have proved adequate over and over again in civil life. We are not to discuss philosophy, nor expediency, nor desirability; we have moved on beyond these and will discuss the approved appliances of civil life which may be adapted to camp life, to the end that the same beneficial results, the prevention of disease, will prevail in the camp that have been known to follow under civil conditions. We will present the means by which our camps may have the simple, but priceless advantage of clean soil, pure water, fresh air, and, therefore, possibly be hygienic camps.

It may be observed that the hygienic camp of instruction must answer all military necessities, and that the appliances of hygiene must never conflict with or run counter to the requirements of the school of the soldier. Therefore in the selection of a hygienic camp the requirements of the commissary department, quartermaster's department and the medical department must be met. In case of a conflict among these various departments, the officer in command, of course, makes the decision.

Experience is equally clear in determining that the first requisite of a hygienic camp is a clean soil. This principle must be absolutely observed in the selection of the camp site. The soil once clean must be kept clean at any cost. The question is one of

exceeding simplicity, and simply requires means for the removal from the camp of all the solid and liquid excretions of the men. To accomplish this, it is necessary that the hygienic abomination, the camp sink, be abolished, care being taken that sewers of sufficient capacity with adequate fall, with convenient openings, be provided for the necessity of the troops. The cost of this work, including the digging of trenches, laying the sewer pipe, and the necessary traps for a camp for a regiment of 1,300 officers and men, will not be beyond $1,000. The time necessary for the prosecution of this work need not be more than one week.

The next requisite for the hygienic camp is to provide for the camp a bountiful supply of pure water, piped from a convenient distance, of sufficient force and volume to provide for the suitable flushing of the sewers. Taps should also be at the head of each company street, in each company kitchen, in the bath tents of officers and men and wherever required. The cost of this apparatus, yielding forty gallons of water per day per man, will not exceed, per regiment $4,000, per brigade $6,500, per division $12,000. In case the water supply of the camp is not absolutely above suspicion a distilling apparatus capable of distilling all the water required in the camp for drinking and culinary purposes should be provided. The cost of such distilling apparatus for a regimental camp will not exceed $2,000. Should it be thought by any that such camp sanitation, even if efficient, would be too expensive, it is only necessary to call their attention to the fact that sanitary appliances are already in use in the navy of this country, the cost of which far exceeds the estimate necessary to make absolutely hygienic camps.

The ventilating system on the battleship Oregon has been estimated by the bureau of equipment of the navy department to cost $50,000. This investment is for the protection of the health of a complement of 424 officers and men. The navy department expends in the distilling apparatus of the ships of our navy sums which equal $50 per man. It may be observed that this expenditure has never yet been faulted, and it would seem that the lives and efficiency of our men at arms on land are equally valuable with those at sea.

In a hygienic camp provision must also be made for the daily cremation of all camp refuse of an organic nature. The cost of suitable apparatus for this important part of camp sanitation would not exceed a few hundred dollars.

Keeping in mind the importance of the preservation of the soil, it is necessary that certain parts of the camp be provided with a concrete or other impervious covering. This is more particularly the case at the bath tents, company kitchens, urinals and such other parts of the camp as are more liable to organic contamination. The cost to provide for this covering would be at the rate of 15 to 20 cents per square foot, and the provision for all the points liable to soil contamination of a camp would not exceed $700.

In camps of instruction a principle of extension has been introduced for sanitary purposes, and although the great numbers of the regiment live in a compacted space—perhaps one-third of the entire camp space—the whole camp was extended at its two ends, with sinks for the soldiers on one side and for the officers on the opposite.

This principle of extension was the best makeshift of the time, but it is obsolete in the presence of appliances for sewering and properly flushing a camp, the fact being that the tent for closets fifty feet away is farther away than the camp sink at 500 feet.

The above items are not the opinion of the speaker, but are the estimates gathered from expert practical men in their several lines, that may be considered absolutely reliable. They show the cost of sanitary appliances for the hygienic camp are, for sewering, $1,000; for water supply, $4,000; for concrete, $700; giving a total of $5,700 as the expense for a camp of a full regiment. In considering this matter you must not lose sight of the fact that these sanitary appliances are practically imperishable; at least they are likely to be serviceable for many years. The interest of $5,700 at 4 per cent. is $228 per year.

A PROSPEROUS LAWYER, whose advice had been asked by a clergyman whose rights in a coal mine had been challenged, found it necessary to examine the mine. With some show of timidity, when about to be let down by a rope, he said to the parson: "Doctor, since I observe that your interests are not wholly confined to the surface of the world, but that you have likewise penetrated to its inmost recesses, how far may it be from this to hell?" "I don't know exactly," gravely responded the parson, "but if you let go your hold on that rope ere you are pulled up, *you'll be there in a minute.*"

THE UTILIZATION OF CITY REFUSE.

By W. F. Morse.

One of the largest items contained in city waste is comprised in the combustible refuse and inorganic matters taken from households, stores and factories. It may be safely estimated that this amount represents 25 per cent. of the whole waste collection of a city, and includes such a great variety of articles and substances mixed in such confusion as to be almost worthless when taken together, but when systematically separated the component parts are useful and valuable. Every article used in a household, after it has been worn out and thrown away, can by the proper agency be turned to some new purpose.

Heretofore combustible waste has been removed by the city scavengers, mixed with ashes, garbage, sweepings and dirt of every character, which has rendered the whole collection worthless. This has been taken to the outskirts of the towns and cities, buried in the ground or covered with ashes, burned, or the surface burned over, thus imperfectly destroying the inflammable parts; or it has been thrown into scows, taken outside the harbors and cast into the ocean. All of these processes are objectionable and unsanitary and are rapidly being set aside in favor of modern and scientific methods.

Two years ago, in the course of an examination made when abroad by the late Colonel George E. Waring, it was shown that combustible refuse had sufficient value to pay for sorting over; that almost everything was marketable, and that if means could be devised by which the separation could be made, it would not only be financially successful in a large degree, but would avoid the complaint of unsanitary disposal.

In 1896 Colonel Waring caused to be constructed in New York City a furnace, which was fed by an endless belt of canvas, on to which was thrown a large proportion of combustible refuse. During the passage of this belt the refuse was roughly picked over and about 25 or 30 per cent. of it found to be marketable.

The following year he caused to be built a larger plant of the same character, with a longer belt or endless traveling apron and a

larger furnace. This is fully described in his annual report of the operations of the Street Cleaning Bureau of New York for 1897. Just prior to his retirement from office as Street Cleaning Commissioner he contracted with the writer for the designs and plans of an improved disposal plant, which should be capable of receiving, sorting and destroying 600 cubic yards per day. His last official act was the awarding of a contract for the construction of this plant, but which, up to this date, has never been built in New York City.

Meanwhile other cities of the United States had been investigating this question of waste disposal on parallel lines. In 1893 a committee of the City Council of Boston made an exhaustive investigation of the methods of disposal of garbage, waste and ashes, and published a report upon the same, giving a history of all methods in use at that date. The writer had the honor of appearing before this committee and of submitting bids for the disposal by cremation of the organic waste or garbage of the city, and in addition thereto submitted plans for a cremating furnace which should deal altogether with the combustible waste, and thereby avoid the necessity of transporting it to sea and the nuisance which naturally attended its lodgment upon adjacent shores.

The Health Department of the city of Boston in 1894, following up the suggestions made by them in previous years, strongly urged the adoption of some method of dealing with the combustible waste which should avoid the nuisances constantly coming to their notice. They recommended the erection of a furnace or incinerator in connection with the garbage dump at Fort Hill Wharf. They renewed this recommendation in the reports of 1895, '96 and '97.

In the spring of 1896 Mayor Quincy set about the investigation of the garbage disposal problem, and a commission comprising the President of the Board of Health, Dr. Durgin; the City Engineer, Mr. William Jackson; the Superintendent of Streets, Mr. B. W. Wells, and the Superintendent of the Sanitary Division, Mr. P. O'Shea, was requested to examine the whole question of the final disposal of city waste and to report upon the same. These gentlemen made an exhaustive survey of all the systems then in use and submitted a personal report, upon the reception of which specifications were issued by the city, asking for bids for disposal by reduction or cremation of the organic waste or garbage of the city, approximating 200 tons per day.

After some delay, a contract was closed with the "New England Sanitary Product Company," organized for the special purposes of this contract, by which this corporation takes the garbage from the city dumps in its own scows, removes it six miles to a point of land projecting into the harbor and manufactures the same into valuable products by the use of the Arnold process. The company is paid $47,700 per year and has a most elaborate and complete plant successfully performing the work.

The ashes and street dirt collected by the city of Boston for the year 1897 amounted to 417,911 cartloads of forty-four cubic feet each. Of this 63 per cent. was deposited on low grounds for filling, 26 per cent. was sent to sea at a cost of 15 cents per cartload and the remainder was disposed of by contractors without cost to the city. These two methods provided for the disposition of the organic waste and the largest portion of the ash and street dirt. There still remained to be considered the combustible refuse.

Following the recommendation of the Board of Health contained in its report of 1897, in April, 1898, the city advertised for bids for the disposal by cremation of such parts of the combustible refuse as might be found worthless, the work to be done upon a wharf adjacent to the Fort Hill Wharf dump, which was leased by the city. The quantity to be so disposed of was estimated to be about 500 cubic yards daily. There were four bids received for the work, varying greatly in amounts and conditions, all of which were rejected by the city as unsatisfactory.

In September following the writer was asked by Mayor Quincy to submit plans for the construction of a refuse disposal plant, to be located on the ground designated, of a capacity of 500 cubic yards daily, which should be guaranteed to remove the valuable parts and destroy the worthless without nuisance. These plans were presented and accepted by the city, and subsequently a contract was made with the "City Refuse Utilization Company," a corporation formed for the special purposes of this contract. It was provided that the company should erect the plant on the city's leased ground, at its own cost, should operate it for ten years, the city having an option at the end of five years for the purchase of the plant upon appraisal, and that the payment made by the city to the company should be $5,500 per year. The company was also to receive all of the valuable or marketable portions saved from the refuse. The designs and plans drawn by Mr. Morse were to be used and the plant to be completed within four months.

This work has been done and the "Boston City Refuse Disposal Station" has been in operation since the 23d of January, 1899.

The plant is located on the ground formerly occupied by the Steam Heating Company, at 462 Atlantic avenue, immediately adjoining the Fort Hill Wharf dump and the Edison Electric Company. It is hardly more than one-half mile from the City Hall. The buildings comprise a main central house, 162 feet long and 40 feet wide, and on each side a storage shed 20 feet wide, of the same length. The central house is supported on steel columns, having a clere-story, which affords light and ventilation. The walls of the building are of brick and the roof of wood, with a fireproof covering. The building is divided into two rooms by a cross wall of brick, cutting off the furnace from the picking room. Through the centre of the main room runs an endless belt or steel apron, 4 feet wide and 150 feet long between centres. This is carried on chain rollers, supported on a steel frame. The first twenty-five feet of this belt is at the ground level. The next section is two and a half feet above the floor and the last thirty-five feet rises on an incline of thirty feet, discharging into a bin placed behind the rear wall of the building. On each side of the level track, which is 90 feet long, are placed hoppers or picking bins into which are put the various classes of paper, rags, cardboard and other articles which are to be dealt with. Below the hoppers are six baling presses, each capable of compressing a bale weighing 450 pounds in fifteen minutes.

The city carts enter from the street, passing over scales where the load is weighed, and discharge their contents upon the conveyor. The mixed mass of material then passes between the hoppers, where lines of men are stationed, who take out the several kinds of paper or rags allotted to each press placed in the basement below the hoppers. There are six classes or separate kinds of paper and cardboard, four of rags, besides clothing, carpets, leather, rubber, bottles, iron of all kinds, tin cans, wood and a great variety of miscellaneous articles.

Across the end of the building, behind the fireproof wall, is placed a *Morse-Boulger Refuse Destructor.* This is a cremating furnace, 50 feet long, 13 feet high and 10 feet wide. On the top are two feeding holes, through which the refuse from the end of the conveyor is conducted by means of a chute into one or the other hole as may be required. This forms a continuous stream of worthless matter passing into the furnace during the discharge of

the conveyor. The receiving bin will hold 200 cubic yards and is intended to be used only for reserve fuel to obtain heat and steam power before the conveyor is put into operation.

The destructor, built under the patents controlled by Messrs. Morse & Boulger, is in many respects different from any furnace heretofore established in this country. The peculiar kind of material to be destroyed, the need for its rapid disposal, the fact that it must be done without any unsanitary results, and the necessity for producing steam power and maintaining it continuously, has compelled the employment of a furnace that presents many novel features in construction and operation. Every precaution is taken for the rapid disposition of refuse and the utilization of all the heat units. The furnace is built of the most refractory fire-brick to be had, with special material molded and shaped to fit each particular place, no iron being used at the points where heat or flame can come in contact.

There are air spaces connected with the interior which admit large amounts of heated air in direct combination with the flames, producing rapid combustion. The outside is bound together by heavy cast-iron buck-stays, connected by strong tie-rods and heavy longitudinal thrust-bars of steel angle iron, to which the doors controlling all openings are securely bolted. Beside the main firebox in the front end there is provided a secondary firebox for the incineration of all smoke, carbon and products of combustion. Special combustion chambers and intervening walls of perforated fire-brick assist in this process, the result being to deliver to the boiler the heat units unmixed with ashes or any light or floating material which would clog the flues. Provision is made for the rapid removal of ashes as fast as they accumulate and for the admission of special currents of air at needed points, and the operation of stoking is conducted with the aid of steam in a way that is exceedingly economical of labor. The device for feeding the furnace through the chute from the end of the conveyor is entirely novel and effective. By its means a continuous stream of refuse may be conducted to the furnace or it may be discharged in quantities of one or two cubic yards at once. The feed holes are covered with solid fire-clay slabs, which by an ingenious apparatus are made to slide over the holes and seal the same air-tight.

The stack or chimney is of steel, self-supporting, 125 feet high, lined with fire-brick and securely bolted to a base 14 feet high. Between the furnace and this stack is placed a steam boiler special-

ly designed and built for this work, controlled by dampers in such a way that it may be operated by its own firebox, independently of the furnace, or it may be driven entirely by the heat from the burning refuse. By a special arrangement of the dampers the furnace may also be operated independently of the boiler when desirable. An engine connected with the boiler drives the shafting which carries the conveyor. There is also a Westinghouse engine, having a separate connection with the boiler, which drives a dynamo for obtaining electric light. Heating coils connected with the steam supply are provided.

The operation of the plant demonstrates perfectly that every condition of the specifications and the promises made by the contracting engineers have been fulfilled. Not only is the material carried by the conveyor, perfectly sorted into its various marketable portions, but the worthless parts are placed in the furnace and destroyed without loss of time and with the minimum of labor. The steam power obtained from the combustible refuse is found to be ample to maintain the engines at their utmost capacity and to leave a surplus, and thus the operation of the plant is entirely self-supporting, using no fuel, destroying all worthless matters without nuisance, with economy of labor and with the utmost rapidity.

There are two large platform scales, one on each side of the entrance doors, for weighing the material as received and as taken away, also elevators or lifts for hoisting from the basement, bins for storage of each separated material and other apparatus which makes the plant at once convenient and economical in working.

The plant is built for the City Refuse Utilization Company, Mr. Herbert Tate, of New York, President. The designs and plans for all the work were furnished by Mr. W. F. Morse, engineer, with the assistance of Mr. H. D. Hooker, architect, and the superintendence has been by Messrs. Morse & Boulger, consulting engineers, 287 Fourth avenue, New York. The construction has been done by Messrs. Jones & Meehan, the well-known contractors, 1 Beacon street, Boston.

(*To be Continued.*)

AN OBSERVATION EXEMPLIFIED.—A boy on the stage danced very finely and obtained much applause. A senior dancer enviously observed that he never knew a clever boy turn out a great man. The boy said: "Sir, you must have been a very clever boy."

REPORT OF THE COMMITTEE ON HYGIENE OF THE MEDICAL SOCIETY OF THE STATE OF NEW YORK.

NINETY-THIRD ANNUAL MEETING,
Albany, January 31 to February 2, 1899.

Your Committee on Hygiene would respectfully report:

The total mortality of our army of industry, last reported by the proper authority of the State, is for the year, 124,600. Of this total mortality 12,370 were deaths from accidents and old age, and the remaining 112,230 deaths show the difference between our hopes and our realization.

The mortality from the diseases generally acknowledged to be communicable was 19,510. Add to these the deaths from consumption, 13,257, known by medical men to be communicable, and we have 32,767. Add to this the next largest single group, the deaths from the acute respiratory diseases, 17,106, and we have 49,873 deaths from diseases most probably communicable and therefore preventable.

The list of killed and died from wounds in the recent Spanish-American war is less than 300. Our people, and possibly ourselves, are liable to blighting indifference to that which is of daily occurrence.

Your committee has the conviction that efforts should constantly be made by this society to make real the responsibility of the profession, and of the people, in the most important of all duties, the protection of the public health and more particularly the prevention of communicable diseases.

Directed by the resolution of the society, following the last report on hygiene, a circular letter was addressed to the medical profession of the State, inviting a forward movement for the better organization in the interest of public health.

The purport of this letter was not only to engage all legally practising physicians, but also public-spirited laymen, to organize, to form societies to share in the work of disseminating knowledge of sanitary science in all its branches. Favorable and sympathetic responses were received in answer to this letter from the following societies: Albany, Allegany, Chautauqua, Chemung, Chenango, Erie, Kings, New York, Onondaga, Orleans, Queens, Suffolk, Tioga, Tompkins and Westchester.

Societies of the character named were organized in the counties of Tioga and Erie, and are doing active, progressive and effective work. Your committee cannot too emphatically indorse the principle that all good citizens should be asked to co-operate in the work of the preservation of the public health. The lead in this work must be kept by the medical profession, but the laity may contribute effectively, and in the important work of creating public opinion can give us invaluable assistance. In the city of Buffalo such an association is formed, known as the Buffalo School Association, which includes in its membership many medical men, and also many non-professional persons.

During the last year this association made a thorough examination into the sanitary condition of every school building in the city. The report of this examination appears in a pamphlet of 72 pages, and is so filled with facts and information as to be of enormous importance to the question of school sanitation.

Your committee is pleased to observe and commend any movement showing an increasing interest on the part of those in authority in matters of public health. For the last three years the efficient health officer of Buffalo has persistently investigated the causes of death among *bottle-fed children.* Under his direction suitable ordinances have been passed looking to the exclusion from our shops of a certain variety of feeding bottle, which experience and science alike demonstrate is a potent factor of the deaths of those under five years of age. Your committee commends this movement and recommends that the attention of the Committee on Legislation be called to its importance.

During the last year the attention of the Legislature was called to another most unfortunate class of our citizens, those suffering from *cancer.* And an appropriation was made for the purpose of investigating this disease. It would seem that the active interest of the support of this society should be given to this effort to place relief, or at least hope, in the sight of this most truly unfortunate class. *Salus populi suprema lex.*

State Sanitarium for Consumptives.

The attention of your committee has been called to a bill now before the Legislature, for the purpose of establishing a State Hospital for the treatment of incipient tuberculosis. Your committee has the conviction that it is only necessary to recall the enormous fatality from this disease, to see that there is no way in which

the State can more intelligently engage her revenues and her efforts, than in the prevention and early treatment of tuberculosis.

In connection with this, we would refer to our health authorities in general, and more particularly to the State Board of Health, directing the attention of all to the fact that their efforts are constantly going out for our protection, and that these efforts to be efficient must be backed by adequate appropriations, we have the abiding conviction that scant or parsimonious appropriations for the protection of the public health is unwise, and should and in the end will be unpopular.

Your committee has received the report of the Chairman of the Committee on Hygiene of the Medical Society of the County of New York, and commend the same in all of its parts. We would suggest that the attention of delegates and members of this society be directed to the importance of keeping this society informed on all matters of local hygiene, and we would urge the desirability of hearing from year to year from the committees on hygiene of every county in the State.

The attention of your committee has been called to the importance of municipal aid in sustaining the work of bacteriological diagnosis of diphtheria and similar diseases, the work has our most emphatic commendation, and we suggest that those making such examinations be encouraged to study and report upon the presence of all pathogenic micro-organisms found in these cases—believing that from such reports will come positive help to our therapeutic efforts in these diseases.

Your committee would offer a word of warning and admonition to those who are obliged to bear the stress and burden of the nerve-wearing and nerve-destroying clangs and jangles of our city streets. To reduce this nuisance to its minimum will, in our judgment, be an important factor in the conservation and protection of the nervous organization of the city dwellers, and the effort to abate this nuisance should ever be encouraged by this society.

The events of the last year of an international character impress your committee with the importance of improved sanitation of our military camps. Our losses in the Spanish-American war were fortunately, and we may reverently declare providentially small, but the significant fact that nearly ten times as many men died from diseases, a large majority of which are admitted to be preventable, as from the casualties of battle, makes it expedient that this society should put forth all its influence to the end that in the

future our military camps shall be provided with every hygienic appliance and oversight which experience or conviction hold to make for the preservation of health, for the prevention of the preventable diseases.

Respectfully submitted,

Henry R. Hopkins, Chairman; E. H. Bartley, C. E. Bruce, J. M. Mosher, O. W. Peck, H. F. Hart, Geo. Seymour.

THE HUNT TO DESTROY DISEASE.

From the New York "Sun," December 25, 1898.

Baron Iveagh, in giving $1,250,000 to the Jenner Institute to promote original and profound research in bacteriology and other forms of biology, in order to determine the causes, nature and prevention of disease, has introduced a novelty in private munificence for the public benefit. It concerns the welfare of all mankind and touches their deepest desire, or the preservation of health and the increase of the span of life. The man who can enable his fellows to resist the causes of disease or furnish to them greater immunity from its assaults, will rank chief among human benefactors, for the preservation and prolongation of life, after all, overtops in the estimation of mankind every other earthly good.

Baron Iveagh is Edward Cecil Guinness, and formerly was the head of the great brewing firm of Dublin whose fame and whose porter have extended the world over for a century. His elder brother, Arthur, was also elevated to the peerage, 1880, as Baron Ardilaun, and his father, Sir Benjamin Guinness, was notable for his munificence to his native city of Dublin, more particularly in the costly restoration of the venerable cathedral of St. Patrick from an almost ruinous condition. Dublin porter, therefore, has served the public in more and better ways than the mere gratification of an appetite, and if now Baron Iveagh's foundation of a school for scientific research, with a view to preserving and prolonging life, shall lead to the ends he establishes it to attain, the name of Guinness will be entitled to a glory few mortal men have secured.

The original investigation he would promote follows the line along which the medical art can hope most confidently to reach the distinction of a veritable science, from which empiricism merely is excluded, for even the powerful influence exerted by the

imagination in producing or curing disease may be reduced to scientific certainty by further advances in physical psychology. The researches in bacteriology have given already a new direction and character to medicine, and the simultaneous and cognate improvement in antiseptic treatment has been even revolutionary in its consequences. Public sanitation, as it is now known, is of comparatively recent origin, and incontestable statistics prove that in consequence of it the average of human life has been increased in civilization and is tending to increase still further. Antiseptic treatment lessened largely the proportionate mortality from wounds in our late war, and it now makes possible successful surgical operations as compared with former wars, which would once have been regarded as little short of downright murder.

It is along this line of investigation, so fascinating to the imagination and so profound in its concern for mankind, that Baron Iveagh would impel research by providing munificently the means for its prosecution. The science he would promote transcends in importance all other explorations in the realm of attainable knowledge, for it reaches to the prime concern of every man, his life. How long would a man live if science could save him from the assaults of bacteria by destroying the germ causes of disease—that is, by eliminating the drawback of disease? And can science do that service for mankind? If it should do it, how could millions be spent in any other way which would contribute so vastly to the satisfaction of the race?

It is this inquiry which is impelling medical science to its most intense activity. In New York, as "The Sun" related yesterday, interest in the same subject of investigation induced St. Luke's Hospital, several years ago, to construct a pathological building, with especial reference to its pursuit by eminent students engaged in biological research. The Board of Managers of the hospital also expressed a desire for an endowment of at least $200,000 for the purposes of such research, but unfortunately no Baron Iveagh has yet appeared here, with a like appreciation of the transcendent importance of the field to be cultivated. Accordingly, the opportunity still remains open for intelligent private munificence; but the sum originally indicated by the hospital is proved by the gift of the great Irish brewer to be far too small.

Benefactions for the care of the sick have been many, but here is a purpose even more important for humanity, or nothing less than the prevention of the sickness itself.

ARTIFICIAL LIGHTING (GAS AND ELECTRIC) FOR PUBLIC INSTITUTIONS—RECENT IMPROVEMENTS.

By Prof. Carlton Lambert, M. A., Royal Naval College, Greenwich, England.

The importance of a system of artificial lighting which shall be at once efficient, economical and healthful, renders a study of the relative advantages of the two illuminants, gas and electricity, in the light of modern developments, of great interest to those who are concerned in the working of public institutions.

Were it not for the invention of Carl Auer von Welsbach, who, in 1887, taught us how to obtain from a cubic foot of gas eight times as much light as we had been accustomed to from our open burners, gas as an illuminant would have been almost entirely out of the field at the present day.

The Welsbach mantle has effected a great revolution in artificial lighting, and has made gas absolutely unapproachable at present by its competitors as a cheap illuminant. It consists, as is well known, of a delicate network of rare earth, thoria, with a 1 or 2 per cent. admixture of ceria. This is placed over a non-luminous Bunsen flame, the heat of which renders the mantle powerfully incandescent. The function of the gas is to generate heat, and that of the mantle is to transform the non-luminous heat energy into luminous light radiation.

It is curious that neither a mantle of pure thoria nor one of pure ceria is at all efficient for light emission, and the wonderful incandescence which is the result of adding less than 2 per cent. of ceria to a thoria mantle is difficult of explanation. It is frequently ascribed to a catalytic action causing great local intensity of combustion somewhat similar to that which induces the union of oxygen and hydrogen in the pores of spongy platinum.

Doubt seems to be thrown on this theory, however, by the fact, established by Le Chatelier, that the light emitted by the mantle is the same whether it is heated in the hot gases at the required temperature before or after they are burnt. Another explanation which commends itself to the writer is based upon the fact that

the emitted waves of a pure thoria mantle are largely ultra blue, or too fast for vision, and those from a ceria mantle ultra red, or too slow. It is suggested that the admixture of ceria so loads the thoria particles as to tune down their vibrations into the bright range of the visible spectrum, and thus to make evident to the eye rays which would otherwise be invisible.

To whatever cause it may be due, the emissive power of the Welsbach mantle is certainly remarkable. The ordinary C mantle, which has been much improved during the last five years, and which is now in general use, frequently gives as much as 70 candle power for a consumption of 3.8 cubic feet of London gas, or an "efficiency" of over 18-candle power per cubic foot of gas burnt per hour. The writer has lately obtained from an ordinary C mantle the high efficiency of 20-candle power per cubic foot. And this is not by any means the best than can be done, for a new type of Welsbach burner is now coming on the market which, by a special construction, causes the gas to induce and thoroughly mix itself with almost the exact amount of air required for perfect combustion, and this without the aid of a chimney; thus a perfect Bunsen flame is produced, and very high incandescence obtained.

The writer's laboratory is at present lighted by one of these new burners, which is giving a light of 110 standard candles at an expenditure of 4.8 cubic feet of gas per hour, an efficiency ten times as great as that of good ordinary fishtail or batswing burners. This means that, with South Metropolitan gas at 2s. 3d. per 1,000 cubic feet, he is getting light at the rate of 110 candles for nearly seven and three-quarters hours for a pennyworth of gas.

In a practical estimate of the cost of Welsbach lighting under everyday conditions it will be necessary to make some deduction from the figures above quoted, and to allow, not only for renewal of mantles, but for a gradual decline in the illuminating power. Assuming a lamp to be lighted for 1,500 hours per year, it is a good rule to allow for three mantles for the period, and to take the average life at 500 hours. A mantle will generally be efficient after much longer use (the writer has one which is still efficient and has been in daily use for five years, since September 27, 1893), but the too long use of a mantle is not always an economy. During the 500 hours' life it is safe, in the writer's experience, to expect an average efficiency of quite 14 candles per cubic foot of gas, so that we may rely upon getting a mean of 50-candle power at the cost of 3.6 cubic feet of gas per hour.

At the Yarrow Convalescent Home, Broadstairs, of which the writer is a trustee, the building was originally planned for an electric installation, but inquiry having shown that the use of the incandescent gas light would result in a large annual saving, the electric scheme was abandoned, the engine, dynamo and accumulator rooms were otherwise utilized, and 156 Welsbach burners were fitted.

During three years to September 30, 1898, accident and decay of the mantles have been covered by 704 renewals, or less than two per burner per annum. During the same period the expenditure on other upkeep was less than 4d. per burner per annum.

The dining hall for 100 children and attendants, which is 64 by 27 square feet in floor area, has four triple gas pendants, with 12 Welsbach lamps and "Cosmos" opal shades. Three burners are found to illuminate the whole hall sufficiently for ordinary purposes, and usually no more are lighted. The economy and general results of the Welsbach lighting have given great satisfaction to the trustees.

Careful domestic arrangements have probably made these results exceptionally favorable, and, therefore, in the general estimate of the comparative cost of gas and electric domestic lighting which follows, a somewhat larger cost of upkeep is assigned to the Welsbach system than has been incurred at the Yarrow Home.

London experience of electric lighting, where the current is retailed at about 6d. per unit (1,000 watt hours), shows that a glow lamp absorbing 64 watts gives, when new, a maximum light of 16 candles. In consequence, however, of the gradual deposit of carbon from the filament upon the glass, the light value falls off and an average of 14 candles is as much as should be expected during the useful life of a nominal 16-candle glow lamp. We will give the advantage, however, to the electric lamp and credit it with 16 candles.

When treating of the old system of open gas lighting it is assumed that the best No. 5 "Bray" burners are used, giving, with London gas, an efficiency of 2½-candle power per cubic foot. This is a very generous estimate, the average efficiency of open burners in practice being more commonly 1½ to 2, and the smaller sizes even less. With this explanation, the following table will give the relative cost at London prices of lighting an institution requiring a total light of 4,000-candle power for 1,500 hours annually with electric incandescents, Bray burners and Welsbach lamps.

COMPARATIVE ESTIMATE.—ANNUAL COST OF MAINTAINING LIGHTS OF 4,000 TOTAL CANDLE POWER FOR 1,500 HOURS BY ELECTRICITY AND GAS.

Electric Incandescent—			
250 16-candle lamps, each absorbing 64 watts; cost of current at 6d. per unit.....	£600	0	0
Renewal of lamps, 500 per annum, at 1s. 6d. each.....	37	0	0
Total.....	£637	0	0
Gas, Open Burners—			
320 Bray's "Special" burners, each giving 12½ c.p. for 5 feet of gas per hour; cost of gas, at 2s. 6d. per 1,000 cubic feet.....	300	0	0
Total.....	£300	0	0
Welsbach Incandescent—			
80 "C" burners, each giving 50 c.p. for 3.6 cubic feet of gas per hour; cost of gas....	54	0	0
Renewal of mantles (240) and extra upkeep, 3s. 6d. per burner per annum.....	14	0	0
Total.....	£68	0	0

Economics can, of course, be effected in electric lighting by the use of small lamps (8 candle) in places where only a little light is required, and also by making the most of the facility afforded for turning the current on and off as required. These advantages are almost entirely met in the Welsbach system by the new small lamps now being supplied, which burn only 1 to 1½ cubic feet per hour, and by the almost universal use of the by-pass burner.

Making all due allowances, however, for some advantage which electric lighting certainly possesses in these and other respects, we cannot help being impressed by the broad deduction from the above table, that electric lighting is twice as dear as the old gas system, and nine times as dear as the Welsbach.

When the new incandescent burners are commonly adopted, the advantage of the Welsbach will be further enhanced.

As some provincial institutions have no access to public electric mains, the following estimate may be useful. It represents the cost of laying down an electric generating plant and installation of

300 sixteen-candle lamps, and the annual outlay for the maintenance of the light, together with the cost of an equivalent of gas lighting.

Electricity—Outlay on Plant—	
Gas engine, 35 brake horse power	£300
Dynamo, 25 kilowatts	160
Accumulators	350
Lamps, switches, wire, fitting, etc	275
	£1,085
Annual Expenditure, 1,500 Hours—	
Renewal of lamps, 600, at 1s. 6d	£45
Depreciation and upkeep, 10 per cent. on £810	81
Labor	40
Gas and oil	110
Interest on plant, 4 per cent. on £810	32
	£308
Gas—Welsbach Incandescent: Annual Cost for Equal Light—	
Gas at 2s. 6d. per 1,000 cubic feet	£65
Renewals of mantles, etc	17
	£82
If current has been supplied from electric mains at 6d. per Board of Trade unit, the annual cost of electric lighting, including lamp renewals, would have been	£765

The one main and undoubted advantage offered by electric lighting is that it does not pollute the air we have to breathe. In the old days of gas lighting this air pollution was, in ill-ventilated rooms, a more serious matter, but now that we get the same light as formerly by burning only from one-sixth to one-tenth the amount of gas, this objection to gas lighting has practically vanished.

A little calculation will make this clear: A room containing 3,000 cubic feet is amply lighted by a single Welsbach. If the ventilation is as usually provided, the circulation through the flue and other outlets and inlets will cause the air contents of the room to be thoroughly changed at least three to four times per hour, the

circulation being, in fact, assisted by a gas burner through the differences of temperature which it sets up. Thus we may say that about 10,000 cubic feet of outside air enter the room hourly. Now a Welsbach burner, consuming 3.6 cubic feet of gas per hour, produces about two cubic feet of carbonic acid gas in the same time. After the lamp is lighted the extra quantity of carbonic acid in the room, resulting from the gas, will gradually, in an hour or so, rise to its maximum, and can never exceed 2 per 10,000 of air. Now this is about half of what already exists in the mountain air of Ben Nevis, and may be altogether disregarded in its effect on health.

Of course, when it is said that because an adult expires only .6 cubic feet of carbonic acid hourly, therefore, a gas burner is as bad as three or four adults, this is only true in the matter of the comparatively innocuous carbonic acid gas which they put forth. It is the organic exhalations from human beings which are a real source of danger, and not the products of combustion of a good gas burner.

The writer in 1894 made a careful test of the purity of combustion in the Welsbach burners. Not the slightest trace of acetylene could be detected, and it was a fair inference that no carbon monoxide was present. Subsequent direct tests by a committee appointed by the *Lancet* established conclusively the entire absence of carbon monoxide. Even the competitors of gas lighting do not now venture to suggest that the combustion in a Welsbach burner is otherwise than perfect. The flame in the new Welsbach burner is, perhaps, the most perfect Bunsen flame ever produced, the inner cone being reduced to a beautiful blue ring not more than three millimetres high, indicating an almost theoretically perfect mixture of gas and air.

It has often been remarked that the Welsbach light is trying to the eyes. Of course this is true of any powerful light if looked at directly, but lights are not made to be looked at; they are intended to illuminate objects which we want to look at. The eyes are usually and easily protected from the direct light of a lamp by opal or other screens.

Oculists do not appear to have put forth any quantitative statements on this subject, but it seems natural to assume that the tiring effect on the eye would depend on one or both of the two following factors: (1) the total amount of luminous energy reaching the retina, and (2) the intrinsic intensity of the image of a bright body. If the first factor is the main one, then diffused daylight

should be far more injurious than many Welsbach lamps. If the latter, then a glowing electric filament would be more likely to produce local injury to the retina of the eye on account of the smallness of the image in which the light is concentrated compared with that of a Welsbach mantle at the same distance.

To insure the best success in the everyday use of Welsbach lamps, attention to a few simple details is necessary, and it may be useful to enumerate here the chief instructions given to those who manage the lights at the Yarrow Home, and which have conduced to the satisfactory results obtained there.

1. Don't leave the gas tap full on, but turn it back until the best light is shown. The gas flame should just fill the mantle. Any more gas burnt gives less light and is only wasted.

2. If a black deposit of carbon should form at the top of the mantle, this is either due to a dirty burner or too much gas being burned. Turn the gas down till the flame only fills one-half of the mantle, giving very little light; the deposit will, in a few minutes, disappear by oxidation.

3. When lighting a burner at the top of the chimney, wait a few seconds after turning the gas on and before applying the light; this prevents shock to the mantle.

4. Burners, especially in dusty rooms, sometimes get clogged by dirt and give poor light. When this is the case carefully remove the mantle from the rod, take off the gallery, and blow vigorously through the gauze or scrub it with a brush. Remove any dust also from the gas nipple by blowing through the air holes at the bottom of the burner; replace and relight. This almost invariably results in a great increase in the light.

The following extract from the report, just received, of the Richmond Public Library Committee shows the result of the removal of the "Wenham" gas burners in that institution and their substitution by incandescent burners, in the effecting of which the writer was instrumental. It concludes this article and should encourage those who are meditating the installation of Welsbach lights:

"The adoption of the incandescent system of gas lighting referred to in last year's report has quite satisfied all expectations as regards increased cleanliness, superior quality of the light, greater purity of the atmosphere and reduction in the amount of gas consumed. The saving in expense by the new system during the year 1897-8 amounted to £21 13s. 4d., or 32 per cent. of the previous year's cost."—"American Gas Light Journal."

EDITOR'S TABLE.

SANITARIAN, MARCH, 1899.

☞All correspondence and exchanges, and all publications for review, should be addressed to the Editor, Dr. A. N. Bell, Brooklyn, N. Y.

PENNSYLVANIA HEALTH RESORTS.

At the last annual meeting of the State Board of Health of Pennsylvania a report by the deputy inspector of the Pocono District was read presenting facts which demonstrated the climatic value of that mountainous section of the State. Physicians are often at a loss to know where to send convalescents and those who have manifested a susceptibility to the tuberculous infection, from the fact that not only the pecuniary means of the patients but numerous other circumstances make it undesirable to advise them to go a great distance from home. The board considered that the information contained in this report would be welcomed by such practitioners, and therefore instructed its secretary to address a brief communication to the medical journals of the country calling attention to the same. The following is a brief abstract of the report:

It showed that during the year the entire district had been free from epidemics of a serious character. Only two cases of typhoid fever occurred, and both of these were unquestionably of foreign origin, the patients returning from abroad to be taken ill at home.

Four cases of diphtheria and five of scarlet rash constituted the entire list of contagious diseases. Malarial affections were conspicuous by their entire absence. The total permanent population of this region is 3,950, but as it contains within its borders a large number of summer resorts, the population during that season is greatly increased. The altitude at Mount Pocono, which may be called the central station of the Delaware, Lackawanna & Western Railroad, is 1,800 feet above the level of the sea, while within a radius of two or three miles from this point accommodations can be found ranging from first-class hotels to comfortable farm houses, with a corresponding tariff of expense, at altitudes varying from 1,400 to 2,200 feet. The soil, being composed of sand, gravel and stone, constitutes a natural filter bed. For this reason the drainage is generally perfect, all surface water disap-

pearing with great rapidity after a heavy rain. Streams of crystal clearness and uniformly cold abound in the valleys, and the hillsides are full of springs. Bacteriological examination of a sample of spring water proved it to be, to all intents and purposes, sterile, not even containing germs of a harmless nature. Hygrometric tests indicate that the average humidity of the atmosphere in the valleys of this region is distinctly below that of our seaboard cities. The temperature in summer ranges about ten degrees below that of New York and Philadelphia. Phthisical cases are found to do well in this pure atmosphere, and there are many cases on record where those who have gone there in the early stages of the disease have been restored to health.'

It will thus be seen that we have, almost at our doors as it were, a natural sanitarium, presenting most of the advantages attached to more distant climates famed for their salubrity, and without the debilitating qualities of those of the far South.

(Signed) BENJAMIN LEE, M. D., Secretary.

THE LOOMIS SANITARIUM.

The second annual report of J. Edward Stubbert, M. D., physician in charge of the Loomis Sanitarium for Consumptives—for incipient cases only—Liberty, N. Y., is remarkably encouraging. Patients in sanitarium November 1, 1897, 78; admitted since, 126: 204. Patients in sanitarium November 1, 1898, 47; discharged cured, 28; discharged disease arrested, 11; discharged improved, 67: discharged who remained stationary, 6; discharged unimproved, 41; died, 4.

"The basis of treatment, as heretofore, has been climatic and hygienic in all cases. The climate is well adapted to almost all forms of tuberculosis as well as to many other troubles. The elevation, 2,300 feet, is within those limits generally conceded to be most advantageous for lung troubles. One peculiar feature of this climate is that it shows good results both in winter and in summer, the winters being long, cold, dry and exhilarating, the summers cool and refreshing.

"By comparing these figures with those contained in my annual report for 1897, published in the 'Philadelphia Medical Journal' of March 12, 1898, page 467, the following increase in good results among patients discharged during these two years will be noted: During the first year 8 per cent. of the patients discharged

had lost their tubercle bacilli, while during the past year 23 per cent. of those discharged had lost their bacilli. During the first year 73 per cent. of those discharged had gained in weight; during the past year 97 per cent. of those discharged had gained in weight. During the first year 13 per cent. of those discharged were cured of their disease, while during the past year 17 per cent. of those discharged were cured. During the first year 10 per cent. of those discharged had their disease arrested; during the past year, 7 per cent.

"It is interesting to note that of those patients discharged after a residence of three months or less at the sanitarium 6 per cent. were cured, while among those remaining longer than three months 11 per cent. were cured; while 30 per cent. of those discharged were so greatly improved as to be able to return to their homes and resume their former work."

NEWPORT'S "BOARD OF HEALTH."

Anent preceding number, we are gratified in having learned that the committee of physicians designated by the City Council to furnish brains for their "Committee on Health and Sanitation," as a substitute for the board of health which they abolished, have declined to serve. They could do no less and maintain their self-respect. The plan of the council was perfectly plain to all sensible observers from the first: to arrogate to themselves the sole authority and responsibility of the health service and to sponge on the doctors for sanitary knowledge. The advisory board of medical men which they conceived, could not order the abatement of a nuisance or require any restriction against the spread of a contagious disease, but only advise the ignorant and self-conceited committee who would exercise its discretion! It is not only a discredit to the city that it has no board of health, but a like discredit to the citizens that they should elect to office men so ignorant of the most important public needs. Competent supervision of and contention against conditions in conflict with the public health are now everywhere regarded by intelligent communities as among the most essential provisions of municipal government. The questions involved are of the most far-reaching significance to the public welfare, requiring expert sanitary knowledge based upon medical education. The assumption of such knowledge, or to ignore the necessity of it, by officials so ignorant of its importance as not to appreciate its necessity is a crime.

A SENSIBLE COMMUNITY.

The Milford (N. H.) Board of Health, in order to stamp out an epidemic of scarlet fever that had been for some time prevailing in the town, January 20th, ordered all public schools, Sunday schools, library and other places where children congregate *to be closed.* The result was so satisfactory that at the end of the following week the health officer reported:

"We have had numerous communications sent us relative to the disease, its cause and effects, during the past week, the following being a sample, all of which contain valuable thoughts and suggestions:

" 'I believe that the text-books in our schools should be fumigated, or, what is better, burned. Those in authority, however, tell me that the books cost $2,000, or more, but let that be as it may, that figure is not the price of the life of one of my children.'

"The matter of the use of pencils can be easily corrected, either by allowing each child to furnish its own, or by adopting methods used in schools in Massachusetts State.

"The buildings occupied by our lower grade schools can be fumigated and cleaned. A little whitewash won't hurt them, and a good scrubbing with sulpho-napthol will do them good. The penetration of a gas in the process of fumigation 'sterilizes,' but does not clean.

"I would emphasize the danger that is present in the exchange of pencils that are actually carried from mouth to mouth. One of the vilest diseases that human flesh is heir to exhibits itself in the mouth.

"The common 'canker' sore in a child's mouth is often traced to the exchange of a 'chew' of gum.

"I recently burned a book from one of our Sunday school libraries that had some of its leaves stuck together with matter expelled from some child's stomach who was suddenly taken ill while looking at the pictures. This was an extreme case, but goes to show that public books can be responsible for the distribution of contagious diseases."

CITY DUMPS AND DISEASE.

The Manchester (N. H.) Board of Health's report for 1898 recalls attention to the dangers of the city dumps. In its report for 1896 the board declared: "The various dumps about the city have given the board more than the usual work this year; not that

they are any more than usual, they have always been decidedly bad, but because houses are being erected on or near them. The board is fully convinced that all the dumps now in use should be discontinued at once, and it will use every legitimate means to bring this about. The time has arrived when our general waste must be disposed of either by burning or by removal far out of the city, and we would recommend that, until a crematory can be installed, a contract of some kind be made with the Boston & Maine railroad to remove the wastes by rail."

A year later the board was obliged to report the situation as bad as ever. It renewed the recommendations of previous years and desired to make them still more emphatic. Its 1897 report makes interesting reading—and reading which will be interesting just so long as Manchester imperils the city's health by clinging to 1798 methods. Says the report:

"What are these dumps then? Simply huge piles, often twenty to thirty feet deep, of all imaginable kinds of refuse, the greater bulk being of perishable matter, much of it when gathered being dry enough to burn. The rest is swill that has been spilled or deliberately mixed with so much other rubbish that it is unfit for feed or fertilizer, tin cans containing portions of vegetables, fish or meat, papers and rags that are too much soiled to be fit for sale as paper stock, and the promiscuous materials gathered from lawns, gardens and back streets. The ashes, brick, lime, etc., constituting imperishable matter is ostensibly used to cover the rest, but practically it is mixed with the rest and no attempt is made at covering worthy the name.

"In these great piles there is always mixture enough to keep up a fermenting and rotting process. They are perfect culture media for all sorts of germs and from the nature of the material it is safe to presume the presence of all those causing the common infections and contagious diseases. For these germs there is ample chance for distribution by the winds, by rag-pickers stirring the surface, by flies swarming about the filthier portions, and, probably most of all, by rats which infest these dumps in great numbers and overrun the neighboring dwelling houses. They burrow through the entire mass, making holes which serve as vents for the foul and dangerous odors and gases that are constantly being generated in volumes far exceeding all the sewer gas of the entire city. * * * Collecting refuse from many streets and piling it up in a pen to rot is not cleaning the city. The ma-

terial might better lie scattered about the streets exposed to the purifying effects of sun and air. * * * We therefore consider these dumps unclean, unsanitary, disgusting and dangerous to the public health." * * *

At the date of this report the Board of Health was satisfied that burning offered the only really sanitary manner of disposing of the refuse, and it so declared itself in the report. At this same date, also, the board had decided to push its application for an injunction against the dumps, a proceeding which resulted, a little later, in the order of court prohibiting dumps within certain limits.

DIPHTHERIA BACILLUS.

At the annual meeting of the Massachusetts Association of Boards of Health, January 26, Dr. Hibbert W. Hill, the director of the city's bacteriological laboratory, who has made a special study of diphtheria bacillus since he opened the laboratory, spoke of it in part as follows:

"The published articles of nineteen or twenty investigators, dating from 1887 to the present time, have established the fact that the bacillus tuberculosis is often found to branch. The bacillus of diphtheria has also shown a similar peculiarity. It has long been held by bacteriologists that bacilli, properly so called, do not branch. The extreme irregularity of outline, found in the rod-shaped organisms which are called the bacilli of diphtheria, is one of the main features by which bacteriologists recognize them under the microscope. The diphtheria bacillus is distinguished from almost any other known bacillus by this very irregularity. If the bacillus were regular in outline, we could have no such diphtheria diagnosis service as we have at present, for the diphtheria bacillus would under such circumstances resemble other bacilli so closely that no one could differentiate them microscopically.

"The question naturally arises, why is this bacillus almost the only one which presents these irregularities? It cannot be merely a provision of nature to enable boards of health to diagnose the disease. Without going into the matter more deeply, I venture to record my belief that the explanation why the diphtheria bacillus differs from all other bacilli lies in the fact that it is not a bacillus at all. This is an explanation which is somewhat in advance of generally accepted ideas. Nevertheless this belief has been growing for some time among those bacteriologists who have paid

special attention to this subject." Dr. Hill then proceeded to explain the scientific value, in diagnoses, of the reclassification resulting from the new discovery.

Dr. Alexander Burr, the veterinary surgeon employed by the Boston Board of Health, read a paper on

HYDROPHOBIA.

It was in part as follows: "Although rabies is a comparatively rare disease, it presents such distressing symptoms when it does occur that universal attention is at once directed to it. The recent occurrence of several cases in Boston makes the subject of interest at the present time. Rabies is an acute febrile disease found in all warm-blooded animals, but is more especially known to us among dogs. Bites upon the exposed parts, as the hands and face, are more fatal than those through the clothing. Spontaneous cases of rabies are now known to be impossible. A sufficient number of cases have occurred in Boston within the last two years to demonstrate that very prompt and stringent measures should be resorted to at once.

"The recent outbreak in Boston derives considerable interest from the fact that no history of the first dog that was bitten could be obtained. It is doubtful that the case would have come to the knowledge of the Board of Health except from the fact that a boy had been bitten by the rabid dog. All the dogs in the vicinity known to have been bitten or exposed to this rabid dog were placed in quarantine upon the owners' premises. Though the quarantine has been well observed, it was seen early in the outbreak that at the best it was a very poor method of quarantine, and as a result the Board of Health at once directed the erection of a detention hospital for dogs, to which all dogs not properly quarantined could be removed, and where their safe isolation could be insured. With the consent of the election department a wooden polling booth was transferred to the epidemic hospital ground on Swett street and a number of kennels at once put up in it.

"In the rear of each kennel is an independent yard. The partitions between the yards are of heavy wire and all separated from each other by a four-inch space, thus preventing the possibility of dogs reaching each other through the meshwork. The outbreak has demonstrated to this department the necessity for such action as the following recommendations outline: There should be an improvement in reporting cases. The compulsory reporting by police, owners and veterinarians of all dogs killed by them as dan-

gerous animals. An autopsy should be made upon all dogs killed. The inoculation of rabbits for diagnosis from all cases reported to the Board of Health as rabid. The strict quarantine for ninety days of all dogs bitten or exposed to infection from a rabid dog. A detention hospital under the direction of the Board of Health, to which all dogs not properly quarantined may be removed."

At the business session, which was held after the dinner, these officers were chosen: President, H. P. Walcott, of Cambridge; vice-presidents, S. H. Durgin, of Boston, and S. W. Abbott, of Wakefield; secretary, E. Farnham, of Cambridge; treasurer, J. B. Field, of Lowell; executive committee, J. C. Coffey, of Worcester; W. H. Chapin, of Springfield; H. L. Chase, of Brookline; J. A. Gage, of Lowell; R. L. Newcomb, of Salem; W. P. Bowers, of Clinton; G. L. Tobey, of Clinton; W. H. Gove, of Salem; W. Y. Fox, of Taunton; Thomas W. Cook, of New Bedford.

"EMBALMED BEEF."

As indicated by the evidence of Dr. W. H. Daly, major and surgeon in the field with General Miles, embalmed beef is that which has been injected, or otherwise treated, with borax and salicylic acid. These are antiseptic chemicals, but they are not favorable to digestion. Moreover, as appeared from the condition of the tin cans containing beef which has been so treated, that have been stored for some time, these chemicals are corrosive of the tin and in consequence favorable to the admission of air, promotive of putrefaction.

HORSE FLESH MARKET.

Among the first results suggested by the prospective supersedure of the horse by compressed air as a civic motor power is the establishment of a market for the sale of horse flesh for food. The suggestion came to President Murphy, of the City Board of Health, January 28th, from the Medora Meat and Provision Company of Medora, North Dakota. The company asks permission to sell dressed horse meat for table use, and says it is willing to compare it with the best dressed beef sent here from Western ranges. In asking for the permission, the company says it wants a location "where can be found the Italian, German, French and Bohemian elements, who are large consumers of horse meat in their own countries. We would respectfully ask the members of the Board of Health to set aside any personal prejudice that may

exist with you and look at the matter from an unbiased standpoint."

The proposal is to slaughter such horses as would be best adapted to the retail trade; well fed and young horses that have never been in harness. "They have been bred solely for food purposes, and none is over five years of age. The slaughtering is performed under the supervision of the United States Department of Agriculture, Bureau of Animal Industry, by act of Congress."

The letter goes on to show the advantage of horse flesh for food. The price of the choicest cuts would not exceed five cents a pound. The company wants to do the slaughtering in North Dakota and ship the meat hence in refrigerator cars.

Section 175 of the sanitary code prohibits the killing of horses within the city limits, but there is no ordinance preventing the sale of horse flesh if the slaughtering is done elsewhere.

SANITARY PROGRESS—NOT ALL ABROAD.

A recent number of the Boston "Herald" remarks upon the unfortunate tendency among our American students of social subjects to believe that everything worth knowing must be sought in Europe. Foreign scientists are not thus ignorant. A young New York sanitary expert, hoping to obtain knowledge, as he thought, at the fountain head, recently traveled to London to investigate the question of purification of drinking water. The English scientific authority to whom he applied asked whether he had consulted with the Massachusetts Board of Health. Upon his confession that he had not done so, the reply was: "Well, that is where we look for information upon that subject." It is to enlighten our people on the merits of some of the administrative services they now have that a series of public lectures on "The City of Boston" has been planned..

The first of these lectures was given by Prof. William T. Sedgwick, of the Massachusetts Institute of Technology, upon the subject of Boston's water supply.

It is questionable, says the "Herald," whether any official department in this State has served the citizens as faithfully as has the State Board of Health. The planning of our new system of metropolitan water supply is perhaps its crowning achievement; but it has performed many other services, though less appreciated, of almost equal importance. One of these, which has had both local and world-wide benefit has been that rendered by the board in its investigation of the subject of filtration of water on a large

scale for drinking purposes. The experiments upon this subject, begun in 1888, were unprecedented in their extent and thoroughness, having had results of inestimable value, not merely to this State, but to the civilized world. They established, upon a basis of accurate observation, the chemical results of filtration, its effect in eliminating dangerous bacteria, and hence the value and feasibility of using sand filters for purifying the water supply of cities. The present purification of the water supply of the city of Lawrence by a filtration plant is the direct outcome of this investigation, a change which has reduced the annual deaths from typhoid fever in that city from an average of fifty-three to an average of only eight a year.

There are many thousands of citizens living to-day in Massachusetts who owe their lives to this and other scientific investigations of our State Board of Health, and tens of thousands of others who have been saved from serious illness by its work. Its achievements are something of which every citizen of Massachusetts has a right to be proud, and as nothing is so inspiring to those who are serving the public as well-earned recognition, it is desirable that the public should be better informed concerning the work that has been done in their behalf.

An illustration of the extent of prevailing ignorance on this subject is found in the fact that when, in 1895, so prominent a specialist as Dr. Albert Shaw wrote his book on "Municipal Government in Continental Europe," he was entirely ignorant of the very remarkable successes in its line of work which had been secured by our Board of Health. Dr. Shaw brought forward, as a means of showing the superiority of the Germans in matters of city government and in the application of practical sanitary science, the building by the city of Hamburg of a filtration plant for its municipal water supply in the years 1892-93. Dr. Shaw claimed that this Hamburg plant was the most complete and successful ever established, and that it was remarkable "for exact and novel demonstrations concerning the action of the filters upon disease germs such as were wholly unprecedented and of inestimable value."

Hamburg's filtration plant was put in the same year as that of the city of Lawrence, but it required a cholera epidemic one year and a threatened return of this visitation the next year to force Hamburg to introduce this protection against disease, whereas the filtration plant in Lawrence was put in because it was believed to be the best scientific method of treating the water problem.

Speaking of the Hamburg plant, Dr. Shaw said that its remarkable merit was found in its ability to reduce the number of cholera germs from a thousand or more to not more than four to ten germs per cubic centimetre. Our State Board of Health reported in June, 1892, that "upon filters of sand five feet deep, devised by Mr. Mills, hundreds of millions of the germs of typhoid fever have been applied to the surface, with water flowing through at the rate of one and a half million gallons per acre daily, but, though examined with the greatest care, none of the germs were found in the water leaving the filters."

Dr. Shaw claimed in his book that the demonstrations concerning the action of filters upon disease germs begun in Hamburg in 1893, were novel and "wholly unprecedented." The value of this claim can clearly be questioned in view of the fact that before 1890 the State Board of Health had made a large number of similar demonstrations, and had in that year published a book of some 900 pages bearing upon this subject. The fact that the man who carried on the Hamburg experiments was named Dunbar, and was born in Minneapolis, may also serve to some extent to modify the claim of Teutonic superiority as founded upon this special example.

PROFESSOR OF HYGIENE AT HARVARD.

Harvard College, "Harvard Crimson" reports, has lately received a novel and interesting endowment, establishing what is to be called a Professorship of Hygiene. The name, however, does not perfectly express the real objects of the anonymous benefactor. The professor is to be the medical friend of the students, a skilful and experienced physician, whose advice and sympathy the students may seek at any time. He must, therefore, be a learned, active and judicious man, interested in the students, and capable of entering quickly and cordially into their feelings. His temperament ought to be genial and sympathetic, and his attainments those of a thorough medical scientist and practitioner. The endowment is large enough to provide, ultimately, a salary higher than is now paid to any professor in the university, but the entire income of the endowment is not yet at the disposal of the corporation.

BOSTON'S PUBLIC BATHS.

Mayor Quincy, of Boston, speaking to a large audience in Cooper Union January 23, advocated municipal baths, gymnasi-

ums and playgrounds for children as sanitary measures. He believes in specialized administration of these public functions for the physical, social and moral welfare of the community.

There are public bathing places in twenty-three of the twenty-five wards of Boston, capable of accommodating about 1,500 daily. The city is now constructing a bathing station to cost $81,000. About $38,000 was the maintenance cost of the baths last year. Thirty-five hundred children were taught to swim. Mayor Quincy considers this a proper part of public education.

Authority has been secured from the Legislature for an expenditure by the city government of $500,000 during the next three years for recreation grounds and gymnasiums.

PRISON IMPROVEMENTS.

Verbal approval has been given by Gov. Roosevelt to suggestions for improvements to Sing Sing and Auburn prisons made by State Superintendent of Prisons Cornelius V. Collins. The work is necessary to put the prisons in proper sanitary condition.

The plan of cell arrangements contemplates steel partitions, which would give each prisoner about eleven inches extra depth and width, thus answering the general complaint of the Prison Reform Association, that health is wrecked and lives sacrificed by overcrowding. A complete system of ventilation and drainage is designed. All the plumbing is to be open, and there is to be a space between the steel backs of the cells extending up to the roof and making a great airshaft, and also making it possible to reach the sewer connection at any time. It is believed that by such a system, and with running water in each cell, the death rate in the prisons would be greatly reduced and the health of the convicts generally improved.

NEW QUARANTINE REGULATIONS FOR THE PREVENTION OF YELLOW FEVER.

By direction of the Secretary of War, January 20, 1899, the following orders of the President were published:

To prevent the introduction of epidemic disease, it is ordered that the provisions of the act of Congress approved February 15, 1893, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine Hospital Service," and all rules and regulations heretofore prescribed by the Secretary of the Treasury under that act are to be given full force and effect in the islands of Cuba and Porto Rico, and the following additional rules and regulations are hereby promulgated:

The examination in ports of the islands of Cuba and Porto Rico of incoming and outgoing vessels and the necessary surveillance over their sanitary condition as well as of cargo, passengers, crew, and of all personal effects, is vested in and will be conducted by the Marine Hospital Service, and medical officers of that service will be detailed by the Secretary of the Treasury as quarantine officers at the ports of Havana, Matanzas, Cienfuegos and Santiago immediately, and at other ports in the islands of Cuba and Porto Rico as soon as practicable or necessary. Quarantine officers shall have authority over vessels, their wharfage and anchorage in infected seaports, in so far as is necessary to prevent the infection of vessels or their personnel, and all vessels, including vessels of the army transport service and merchant and coastwise vessels, leaving ports in the islands of Cuba or Porto Rico for the United States or for other ports in the islands of Cuba or Porto Rico, vessels of the United States Navy excepted. Quarantine officers will enforce necessary measures on incoming vessels through collectors of customs at ports of entry, who will not permit entry without quarantine certificates, and bill of health shall not be given to an outgoing vessel unless all quarantine regulations have been complied with. All officers of the army transport service and medical officers of the Army and Marine Hospital Service on duty on army transports will use every precaution to prevent danger of exposure to infection of crews while in ports in the islands of Cuba or Porto Rico.

Since the quarantine service herein provided is for the protection of the islands of Cuba and Porto Rico as well as the protection of the United States against both, the expenses arising therefrom will be charged at present both against the revenues of these islands and the epidemic fund; said expenses will be divided equally against both, payments, however, to be made out of the epidemic fund and reimbursement made thereto from the revenues of the islands of Cuba and Porto Rico.

OBITUARY.

GEORGE HENRY ROHE, of Baltimore, died suddenly in New Orleans, while on a visit there, February 6, 1899. He was the son of John and Margaret Rohe, both natives of Bavaria, and was born January 26, 1851, in Baltimore county. He was educated in the public and parish schools in Baltimore city and county, and

began the study of medicine in ··nder the late Prof. August F. Erich. He attended three courses of lectures at the University of Maryland School of Medicine, and was graduated therefrom in March, 1873. Hs afterward studied dermatology in Boston under Dr. Edward Wigglesworth. After some years spent in travel he returned to Baltimore and engaged in general practice until his appointment by Mayor Davidson as city health commissioner in 1890. For a short time, in 1885, he was acting assistant surgeon in the United States army. He had been professor in the College of Physicians and Surgeons since 1881, and filled the chairs of therapeutics, materia medica, hygiene and mental diseases. He was appointed superintendent of Spring Grove Asylum in 1891, and in 1896 was selected to take charge of the new asylum at Springfield.

Dr. Rohe was a member of the American Medical Association; American Public Health Association, of which he was elected president at the last annual meeting in Ottawa; American Association of Obstetricians and Gynecologists, and its president in 1893; the Medical and Chirurgical Faculty of Maryland, and its president in 1893; the American Medico-Psychological Association; American Electro-Therapeutic Association; Clinical Society of Maryland; Baltimore Medical Association; Baltimore Neurological Society; Medical and Surgical Society of Baltimore; Southern Surgical and Gynecological Association; was a member of the committee on organization of the first Pan-American Congress; American Academy of Political and Social Science; foreign associate member of the Societe Francaise d'Hygiene, and secretary and treasurer of the Rush monument committee.

Dr. Rohe was the author of many papers published in the transactions of the American Medical Association and of the American Public Health Association. He was author of a "Text-Book on Hygiene," which has run through three editions; a work on "Practical Electricity in Medicine and Surgery," and a "Manual on Skin Diseases." He was associate editor of the Annual of the Universal Medical Sciences.

Dr. Rohe was married in 1890 to Miss Mary Lauderman Coffin, of Baltimore, a descendant of Tristam Coffin, the original settler of Nantucket Island in 1660. He is survived by his wife and one child—Margaret Rohe.

MORTALITY AND MORBILITY REPORTS AND REVIEWS.

Correspondents under this head are particularly requested to be as prompt as possible.

Report of the Surgeon-General of the Army to the Secretary of War for the Fiscal Year Ending June 30, 1898.

The report opens with a statement of financial transactions for the year. The appropriation of $135,968.07, March 2, 1897, is accounted for by enumerated expenditures and $42.88 on hand.

Health of the Army during the calendar year 1897 was excellent, as may be seen from the following statement of its sick rates: The admissions for disease and injury during the year amounted to 1,186.61 per thousand of the strength present as compared with 1,110.39 in the previous year, with 1,258.89 the average annual rate of the previous decade, and with 1,089.73 the lowest rate of our army, recorded in the year 1894. The rate for disease was 896.53, the lowest rate, recorded in 1896, having been 830.65. The number constantly sick, or the rate of non-efficiency, was 35.85 per thousand of strength, as compared with 33.97 during the previous year, with 40.26 the average annual rate of the previous decade, and with 33.89 in 1895, the lowest recorded rate. The average number of days lost on account of sickness for each man of the army was 13.08, as compared with 12.43 in 1896, and with 14.64 the average annual rate of the preceding decade. The rate of discharge on account of disability was 9.61, the lowest recorded rate, as compared with 10.15 in 1896 and with 19.78 the annual rate of the previous decade. The total death rate for the year, 5.11, and the death rate from disease, 3.14, were also lower than the lowest rates heretofore recorded, 5.16 for disease and injury in 1895, and 3.83 for disease alone in 1896.

The admission rate of the white troops for the year was 1,180.84, for the colored troops 1,248.61, while the rates of non-efficiency were respectively 35.72 and 37.24 per thousand of strength.

The deaths numbered 140—86 from disease and 54 from injuries. Gunshot wounds occasioned 19 deaths; typhoid fever, consumption, and disease of the heart 9 each. Five deaths, the largest number occurring at any one post, were reported from each

of seven posts: Fort Riley, Kan.; the Presidio of San Francisco, Cal.; Fort Sheridan, Ill.; Fort Sam Houston, Tex.; Columbus Barracks, Ohio; Fort Meade, S. Dak., and Fort McPherson, Ga.

In the military departments the admission rate varied from 784.44 per thousand of strength in the Department of the Columbia to 1,522.14 in the Department of Texas, and the rate of non-efficiency from 25.65 to 39.65 in these same departments; the discharge rate, from 4.59 in the Department of the Platte to 13.93 in the Department of the Colorado, and the death rate from 3.15 in the Department of California to 7.27 in the Department of the Platte.

Recruiting: The total number of men examined for enlistment during the year 1897 was 13,139, of whom 12,131 were white and 1,008 were colored. The number accepted was 9,226, or 702.19 out of every thousand examined. The physique of the colored candidates was apparently of a higher order than that of the white men, as their ratio of accepted men was 786.71 per thousand, as compared with 695.16 among the white candidates. White men to the number of 33.30 and colored men to that of 16.86 per thousand declined enlistment. The rate of rejections on primary examination was 271.54 among the white and 196.43 among the colored candidates, giving a mean of 265.77 rejections per thousand of those examined. This shows an improvement in the character of the candidates, for in 1896 the ratio of rejections was 371.65; in 1895, 473.45, and in 1894, 508.50. The care taken in the examination of recruits has not in any way been relaxed during recent years.

Of every thousand candidates examined 90.19 were rejected on account of imperfect physique, under weight, under height, etc.; 37.14 for diseases of the eye, 27.55 for diseases of the circulatory system, 23.52 for diseases of the genito-urinary system, 12.48 for diseases of the digestive system, 10.80 for venereal diseases, while 10.73 were rejected on account of bad or doubtful character or unsatisfactory references, 7.15 as generally unfit or undesirable, and only 2.43 on account of illiteracy, imperfect knowledge of the English language or mental insufficiency.

Of every thousand of the accepted men 742.47 were natives of the United States, 80.53 were born in Germany, 77.28 in Ireland, 23.20 in England, 13.98 in Sweden, 13.22 in Canada, 7.48 in Denmark, and 7.05 in Austria; the remainder in various other countries.

Medical Officers.

During the year ended June 30, 1898, there were 124 medical officers, United States Army, and 60 contract surgeons on duty in the field. Appointments: Nineteen assistant surgeons with the rank of first lieutenant. Promotions: Two surgeons with the rank of major to be deputy surgeons-general with the rank of lieutenant-colonel; 6 assistant surgeons with the rank of captain to be surgeons with the rank of major; 10 assistant surgeons with the rank of first lieutenant to be assistant surgeons with the rank of captain. Deaths: One surgeon with the rank of major; 1 assistant surgeon with the rank of captain. Retirements: Two deputy surgeons-general with the rank of lieutenant-colonel; 2 surgeons with the rank of major; 1 assistant surgeon with the rank of first lieutenant. Resigned: One assistant surgeon with the rank of captain; 1 assistant surgeon with the rank of first lieutenant.

A board was convened in Washington, D. C., September 27, 1897, to examine candidates for admission into the Army Medical Department. Of 45 candidates who were authorized to appear before the board, 34 presented themselves for examination, and of these only 6 were accepted; 7 were rejected on account of physical defects. Before another board convened in the same city, May 2, 1898, 136 candidates were authorized to appear. Of 97 who presented themselves for examination 13 were accepted; 16 were rejected on account of physical defects.

Army Medical School.

The fourth session ended April 1, 1898. The courses of instruction continued as laid down in the order establishing the school in 1893, namely, duties of medical officers, military surgery, military medicine, military hygiene, sanitary chemistry, clinical and sanitary microscopy, and hospital corps drill and first aid. Under authority of the War Department and direction of Colonel Sumner, commanding, instruction in riding was given at Fort Myer, Va., every Saturday morning by Lieut. H. A. White, Sixth Cavalry. A practical course in operative surgery was conducted by the professor of military surgery, as was done last year, and the student officers attended surgical clinics at Barnes Hospital, Soldiers' Home.

Auxiliary lectures have been delivered on military law; on mental diseases at the Government Hospital for the Insane, under the direction of the superintendent; on the Army Medical Library, and on parasites in man.

Hospital Corps: On June 30, 1897, there were in the service 98 hospital stewards, 99 acting hospital stewards, and 513 privates, a total of 710. During the period from July 1, 1897, to March 31, 1898, the gains and losses balanced each other so nearly that the total number in the service in the corps oscillated only between 710 on June 30, 1897, and 723, March 31, 1898.

The Army Medical Museum added 427 new specimens during the year, the total number, June 30, 1898, being 35,025. Library of the surgeon-general's office added 7,599 volumes; total to date, 216,839. Index catalogue progressing, manuscript for Vol. IV. in course of preparation.

The Work of the Medical Department During the Spanish War.—The number of medical officers, 192, allowed by law to the army is inadequate in time of peace.

The large number of sick which had to be cared for during the progress of the war in regimental, division, and general hospitals rendered imperative the employment of additional medical assistance. Under the provisions of the act approved May 12, 1898, the services of over 650 contract surgeons were engaged. Most of these doctors from civil life did good service. Many of them were thoroughly well equipped physicians and surgeons, with ample hospital experience, but it was impracticable to have the qualifications of each passed upon by an examining board.

Hospital Corps.—On April 25, 1898, in connection with the call of the President of the United States for 125,000 volunteers, I recommended that the law restricting the number of hospital stewards to 100 be changed, and that for each regiment of volunteer infantry or cavalry there should be enlisted 1 hospital steward, 1 acting hospital steward, and 25 privates; for each battery of artillery 1 hospital steward and 5 privates, and for each division of the army 1 hospital steward, 1 acting hospital steward, and 50 privates, to serve under the direction of the chief surgeon of the division. In addition to the 200 stewards thus authorized, each volunteer organization received into the service was allowed 1 hospital steward for each battalion. There was, however, no provision made for Hospital Corps men for the volunteer troops, except that which empowered the Secretary of War to enlist as many privates of the Hospital Corps as the service may require.

To provide this corps with the necessary number of men a number of medical students, pharmacists, and young graduates in medicine enlisted in the Hospital Corps for service during the war.

Recommendation was made May 14, 1898, that mustering officers be instructed to enlist desirable men, approved by medical officers, at the rate of 5 for each battalion, and subsequently that these be permitted to accompany the regiments on their future service. This recommendation was reiterated June 18, in a communication to the Adjutant-General. Meanwhile General Orders, May 31, 1898, authorized the transfer of men from the line of the volunteers to the Hospital Corps of the Regular Army, upon the recommendation of the chief surgean, and suspended the provisions of Army Regulations governing the Hospital Corps so far as they were inapplicable in time of war and with troops in the field. The number of men enlisted and transferred was approximately 6,000.

Contract Nurses.—The want of a sufficient body of trained Hospital Corps men necessitated the detail of enlisted men from the regiments for hospital duty in several of the camps and the employment of trained nurses at the general hospitals. Foreseeing the necessity for a large force of the latter, I applied to Congress April 28, 1898, for authority to employ by contract as many nurses as might be required during the war. This was promptly granted.

Over 1,700 female nurses have been employed, at first at the general hospitals and later at the field division hospitals, when it became evident that the field service purposes for which the latter had been organized would have to give place to the imperative need of caring for the many sick men coming from the regimental camps. These hospitals ceased to be ambulance hospitals and their character of fixed field hospitals was promptly recognized by assigning contract surgeons and nurses to duty with them and providing them with articles of equipment which can not be carried in the hospital wagons of a marching command. Many of the trained nurses were Sisters of Charity, whose services were highly appreciated by medical officers in charge, as well as by the individual sick men, who benefited by their ministrations. Others were obtained through the kind assistance of the Red Cross Society for the Maintenance of Trained Nurses.

Medical and Hospital Supplies.—The authorized strength of the army, April 1, 1898, was a little over 28,000, officers and men. This force was stationed as garrisons at military posts, and while the supplies furnished were more especially adapted to the medical wants of troops serving under such conditions, there was ample provision for field service, especially at posts where active service against Indians or riot duty was possible.

Immediately upon the declaration of war, April 21, steps were taken to obtain medical supplies for the new Volunteer Army. For the more important articles, and those of highest cost, bids were invited at short notice, such, for instance, as medical and surgical chests, litters and slings, field operating cases, pocket cases, orderly and hospital corps pouches, etc. Orders were given and the manufacture expedited with the utmost despatch. On May 3, foreseeing that it would be impossible to have ready for issue to the volunteer regiments, as soon as they were mustered in, the medical and surgical chests above referred to, as well as other articles of field equipment, although their preparation was pushed with the utmost despatch, I telegraphed the governors of the several States for authority to utilize the medical equipment of the National Guard in the service of the State Volunteers until our army medical supplies were ready for issue. Most of the governors of the States who had field equipment responded promptly and satisfactorily, but, unfortunately, many of the State medical departments had no such equipment. Meanwhile the officers in charge of the medical supply depots in New York and St. Louis were directed to make arrangements so that supplies could be immediately obtained for 100,000 men for six months.

As the supply table published in 1896 was prepared for garrison use in time of peace and was inappropriate for the use of troops in the field, a field supply table was prepared and approved by the Secretary of War May 9, 1898.

To provide temporarily for volunteer regiments organized and ordered to camps before the new medical and surgical chests were ready for issue, supplies of medicines, instruments, hospital stores, stationery, and miscellaneous articles, according to a prescribed list and packed in convenient boxes, were prepared at the supply depots.

Requests from medical officers for supplies and orders based thereon transmitted to the supply depots were largely by telegraph, and orders were given that when the supplies were needed promptly they should be forwarded by express to their destination. When a medical officer desired to purchase medical and other supplies for use in emergencies authority to do so was always granted.

On account of the urgency attending the establishment of Camp Wikoff the officer in charge of the New York supply depot was directed to honor all requisitions made by the chief surgeon at Montauk Point without referring them for approval of this office.

A railroad ambulance train was, in my opinion, essential to the well-being of the sick and wounded during transportation from Tampa, Fla., the probable base of operations against Cuba, to general hospitals in the interior. Accordingly, on May 30, 1898, I recommended the equipment of a train to consist of ten tourist sleepers and a dining car. This was approved, and on June 16 I was informed that a train of ten Pullman sleepers, a dining car, a private car, and a combination car was ready for service. The train was inspected by Maj. Charles Richard, surgeon, United States Army, who was placed in command. One assistant surgeon, 2 stewards, 20 privates of the Hospital Corps, and 3 civilian employees were assigned to him for service. The train was amply provided with all the medicines, hospital stores, and comforts required for the patients to be transported. The first trip made was from Washington, D. C., to Tampa, Fla., for the purpose of transporting sick from the latter place to the general hospital, Fort McPherson, Ga. Tampa was reached June 19, and Fort McPherson June 22. Here the Pullman cars were exchanged for the tourist sleepers originally requested. The latter were much better adapted for hospital purposes on account of their general arrangement, better ventilation, and convenience for cleanliness and the handling of patients. They had 134 lower and 136 upper berths, giving a total carrying capacity of 270. It was impracticable, however, to use the upper berths for severe cases, on account of the impossibility of giving proper care and attention to such patients occupying them.

Several trips were made between Tampa and Atlanta, on each of which great delay, involving inconvenience and anxiety to all concerned, and discomfort and even harm to the sick, was occasioned by the difficulty of obtaining a prompt response from local quartermasters to requisitions for the necessary transportation. On one occasion, after a delay of twenty-four hours, telegraphic communication with Washington had to be established before a movement was made. However, on July 4, Capt. H. R. Stiles, assistant surgeon, United States Army, on duty with the train, was appointed an acting assistant quartermaster, with authority to issue transportation requests. Major Richard reported of this:

"Not only has this change given me more time to attend to the more important functions of my charge, and has avoided many vexatious delays, but it has enabled me to come in direct communication with the railroads and a better understanding is

reached regarding speed, routes and care of train en route, all of which factors should be considered in a service which has for its object the comfortable and rapid transportation of the sick and wounded."

Up to August 31 the hospital train had run about 17,500 miles, and transported 1,935 patients with only four deaths. Notwithstanding the large number of typhoid cases transported and the difficulty of handling such cases on this train, disinfection was so efficiently carried out that no case of this disease occurred among the personnel of the train. The utmost care was given to the disinfection of excreta, to prevent any danger of the dissemination of the disease during the transportation of the sick.

Hospital Ships.—On April 15, 1898, I applied for a ship to be used as a hospital ship. On May 18, by direction of the President, the *John Englis* was purchased, and afterward called the *Relief*. The Quartermaster's Department took charge of her to prepare her for the special service required. The necessary work upon the vessel required much more time than was anticipated.

The *Relief* sailed from New York July 2 and arrived at Siboney on the 7th. She left Siboney July 19 with 254 sick and wounded and arrived at New York on the 23d. She sailed for Ponce, Porto Rico, August 3, and returned to New York on the 19th with 255 sick and wounded. The vessel made another trip to Ponce, Porto Rico, returning with sick, September 6, to Philadelphia, whence she went to Montauk Point to transport sick to hospitals in Boston, Mass., and Philadelphia, Pa. Another trip to Porto Rico was then made, the vessel returning October 11 to Fort Monroe, Va.

The hospital ship *Missouri*.—On July 1, 1898, Mr. B. N. Baker, president of the Atlantic Transport Line, Baltimore, Md., tendered the steamship *Missouri*, with her captain and crew, to the Government as a hospital ship. This generous and patriotic offer was accepted by the Secretary of War, and Maj. W. H. Arthur, surgeon, United States Volunteers (assistant surgeon, United States Army), was ordered to take charge of her preparation for service, and subsequently to command her. August 23 she sailed for Santiago. She returned from Cuba with 256 sick men, who were landed at Montauk Point. Her second voyage was to Porto Rico, whence she brought 270 patients to the Josiah Simpson Hospital, Fort Monroe, Va., on October 6.

The hospital ship *Olivette* was a steamship which had been doing service as a water boat for the fleet of transports when Lieu-

tenant-Colonel Pope, chief surgeon of the Fifth Army Corps, selected for her use as a hospital ship during the voyage from Tampa, Fla., to Santiago, Cuba. On the arrival of the fleet at Daiquiri she relieved the transports of their sick, many of whom were later transferred to the steamer *Iroquois,* so that room was made on the improvised hospital boat for the wounded expected from the impending battle. The *Olivette* answered her extemporized purpose excellently. She left Santiago July 9 with 279 wounded officers and men, and reached New York on the 16th. She returned to Santiago with medical supplies for the troops, and on August 15 sailed with 203 sick men, who were distributed in Boston city hospitals. The *Olivette* sailed August 25 from Boston under orders to Fernandina, Fla., for the purpose of bringing sick to the general hospital at Fort Monroe, Va. On August 31, while coaling in stormy weather off quarantine at Fernandina, she listed heavily, filled with water, and sank in 20 feet of water. No loss of life occurred.

The Health of the Troops.

Promptly following the declaration of war, arrangements were made by the War Department to recruit the Regular Army to its war strength, and to muster in the volunteer troops called out by the proclamations of the President. The Regular Army at that time consisted of well-developed men, sound in physique, and well drilled and disciplined. In its ranks were only about 40 boys under 21 years of age enlisted as musicians; but when recruiting was begun the minimum age for enlistment in the regulars was reduced to 18 years, and boys of this age were accepted for the volunteers. All military experience shows that young men under 21 years break down readily under the strain of war service; and every regiment had many of these youths in its ranks.

Soon after the newly raised levies were aggregated in large camps sickness began to increase progressively from causes that were so general in their operation that scarcely a regiment escaped from their harmful influence. These causes may all be referred to ignorance on the part of officers of the elementary principles of camp sanitation, and of their duties and responsibilities as regards the welfare of the enlisted men in their commands. Officers who were responsible for the clothing and equipment of their men, for their shelter, drill, discipline, and personal cleanliness—in fact, for their comfort, well-being, and sound physical condition—were to a large extent ignorant of how to act in order

to sustain their responsibilities, and others were even ignorant that these responsibilities rested on them. Medical officers, as a rule, were also without experience in the sanitation of camps, and the prevention of disease among troops. The few who knew what should be done were insufficient to control the sanitary situation in the large aggregations of men hastily gathered together. As a result officers and men appear to me to have regarded the deplorably insanitary conditions under which they lived in their camps of organization, as the inevitable conditions of camp life preparatory for field service, and to have accepted them without question until general attention was attracted to them by an outbreak of typhoid fever. Officers and men in these camps were rife for war, and drill, parades, practice marches, and military-camp duties occupied the whole of their time and energies. Considerations of domestic economy and sanitation in the companies and regiments were not given proper consideration, and men who were being taught to meet the enemy in battle succumbed to the hardships and insanitary conditions of life in their camps of instruction.

The sites of certain of the camps have been instanced in the newspapers as the cause of the sickness that was developed in them. A review of the whole situation shows that it was not the site, but the manner of its occupation which must be held responsible for the general spread of disease among the troops.

The primary evil was overcrowding of the site. The aggregation of the troops was effected hastily. On his arrival at Camp Alger the medical officer assigned to duty as chief surgeon found a number of regiments already in camp; "troops were arriving with every train, generally without previous announcement, and these camped where they saw fit." As a general hygienic, as well as a military principle, troops in the field should encamp in rear of their color line. The area occupied as a camping ground should be as wide as the color line is long. Lieutenant-Colonel Smart, in his inspection of Camp Alger, found company streets hardly wider than the intervals between adjacent companies should have been, and tents of the same company in contact with each other on the sides, and in contact on the ends with those of the adjoining company, so that the double row of tents between the narrow company streets made a continuous canvas covering 70 to 80 feet long and 16 feet wide, under which 100 men had to find shelter. Even

when space was allowed between the tents of the same and adjacent companies, it was wholly insufficient for proper trenching, ventilation, and passageway.

On April 25, 1898, foreseeing the likelihood of insanitary conditions in the camps of our newly raised troops, and with the view of preventing them, I issued Circular No. 1 from this office, impressing upon medical officers their responsibility in sanitary matters, and the necessity for a strict sanitary police, particularly in the care of the sinks and in the preservation of the camp area from contamination. But the density of the military population on the area of these contracted camps prevented the possibility of a good sanitary condition. Camps of this character may be occupied for a week or two at a time without serious results, as in the case of national guardsmen out for ten days' field practice during the summer, but their continued occupation will inevitably result in the breaking down of the command by diarrhœa, dysentery, and typhoid fever.

The only explanation that can be given is that the officers, military and medical, having no experience of military life in the field, assumed that the deplorable condition in which they were living was the usual mode of life of soldiers situated as they were, and that their duty as true soldiers was to endure, not only without complaint, but with a certain pride, the hardships of their camp life.

Practically nothing was done to make the men comfortable, or to remedy the insanitary conditions until these were brought to the attention of the Secretary of War by inspectors sent out by special orders from the War Department. Then the camps held for so long were abandoned, but not before the manifestations of typhoid infection were rife in them, new sites were carefully selected, regimental camps were expanded, company tentage increased, and board flooring provided. Then, for the first time, the troops went into camps suitable for the occasion.

NEW YORK, 6,789,313, Dec., '98: Total deaths, 10,877; under 5 years, 2,969; annual death rate per 1,000, 19.0; from typhoid fever, 156; diphtheria, 244; phthisis, 1,185; acute respiratory diseases, 2,250.

City of New York, 3,550,053, Dec., '98: Total deaths, 6,001; under 5 years, 1,524; annual death rate per 1,000, 20.2; from ty-

phoid fever, 54; diphtheria, 153; phthisis, 732; acute respiratory diseases, 1,426.

Borough of Manhattan, 1,953,569, Dec., '98: Total deaths, 3,342; under 5 years, 921; annual death rate per 1,000, 20.5; from typhoid fever, 28; diphtheria, 78; phthisis, 388; acute respiratory diseases, 783.

Borough of the Bronx, 163,537, Dec., '98: Total deaths, 357; under 5 years, 70; annual death rate per 1,000, 30.0; from typhoid fever, 3; diphtheria, 10; phthisis, 88; acute respiratory diseases, 67.

Borough of Brooklyn, 1,231,548, Dec., '98: Total deaths, 1,978; under 5 years, 460; annual death rate per 1,000, 19.5; from typhoid fever, 20; diphtheria, 60; phthisis, 221; acute respiratory diseases, 474.

Annual Report.—Comparing the statistics of 1898 with those of 1897, the mortality was greater; chiefly accounted for by the deaths from sunstroke during the protracted hot spell of last summer and the increased numbers from diarrhœal diseases, 3,318 against 2,850. There was also a marked increase in the number of deaths from typhoid fever, 269 against 164, in part accounted for by the deaths of soldiers in the hospitals. The most, indeed the only particularly noticeable decrease, was from diphtheria, 743 against 998.

Borough of Queens, 134,139, Dec., '98: Total deaths, 214; under 5 years, 49; annual death rate per 1,000, 20.0; from typhoid fever, 3; diphtheria, 3; phthisis, 25; acute respiratory diseases, 72.

Borough of Richmond, 67,260, Dec., '98: Total deaths, 110; under 5 years, 24; annual death rate per 1,000, 20.5; from diphtheria, 2; phthisis, 10; acute respiratory diseases, 30.

Albany, 100,000, Dec., '98: Total deaths, 192; under 5 years, 37; annual death rate per 1,000, 23.0; from typhoid fever, 11; diphtheria, 0; phthisis, 23; acute respiratory diseases, 32.

Troy, 65,000, Dec., '98: Total deaths, 113; under 5 years, 21; annual death rate per 1,000, 21.0; from typhoid fever, 2; diphtheria, 2; phthisis, 13; acute respiratory diseases, 28.

Utica, 55,000, Dec., '98: Total deaths, 92; under 5 years, 12; annual death rate per 1,000, 20.0; from diphtheria, 1; phthisis, 10; acute respiratory diseases, 16.

Syracuse, 120,000, Dec., '98: Total deaths, 134; under 5 years, 16; annual death rate per 1,000, 13.4; from typhoid fever, 3; diphtheria, 3; phthisis, 21; acute respiratory diseases, 18.

Buffalo, 360,000, Dec., '98: Total deaths, 368; under 5 years, 80; annual death rate per 1,000, 12.2; from typhoid fever, 9; diphtheria, 7; phthisis, 48; acute respiratory diseases, 61.

Rochester, 175,000, Dec., '98: Total deaths, 191; under 5 years, 24; annual death rate per 1,000, 12.4; from typhoid fever, 2; diphtheria, 8; phthisis, 28; acute respiratory diseases, 29.

Yonkers, 40,000, Dec., '98: Total deaths, 63; under 5 years, 16; annual death rate per 1,000, 18.0; from diphtheria, 1; phthisis, 8; acute respiratory diseases, 19.

Cohoes, 24,000, Dec., '98: Total deaths, 46; under 5 years, 9; annual death rate per 1,000, 23.0; from typhoid fever, 8; phthisis, 4; acute respiratory diseases, 11.

Kingston, 25,500, Dec., '98: Total deaths, 45; under 5 years, 8; annual death rate per 1,000, 21.5; from phthisis, 2; acute respiratory diseases, 11.

Poughkeepsie, 23,200, Dec., '98: Total deaths, 40; under 5 years, 5; annual death rate per 1,000, 21.0; from typhoid fever, 0; diphtheria, 0; phthisis, 1; acute respiratory diseases, 11.

Newburgh, 24,536, Dec., '98: Total deaths, 33; under 5 years, 5; annual death rate per 1,000, 17.0; from typhoid fever, 0; phthisis, 4; acute respiratory diseases, 10.

Schenectady, 24,374, Dec., '98: Total deaths, 46; under 5 years, 12; annual death rate per 1,000, 22.0; from phthisis, 6; acute respiratory diseases, 11.

Binghamton, 34,514, Dec., '98: Total deaths, 58; under 5 years, 8; annual death rate per 1,000, 20.1; from typhoid fever, 2; diphtheria, 2; phthisis, 6; acute respiratory diseases, 9.

Elmira, 30,000, Dec., '98: Total deaths, 34; under 5 years, 4; annual death rate per 1,000, 12.6; from typhoid fever, 1; phthisis, 3; acute respiratory diseases, 8.

Oswego, 22,000, Dec., '98: Total deaths, 31; under 5 years, 5; annual death rate per 1,000, 17.0; from typhoid fever, 0; phthisis, 5; acute respiratory diseases, 4.

ARKANSAS.—Little Rock, January 26.—Dr. H. C. Dunavant, president of the State Board of Health, reports a terrible state of affairs at Salem, in Fulton county. There have been at least 400 cases of smallpox there within the last two months and a number of deaths from it. He found people walking about the streets of

the town broken out with the disease, and others falling ill every day. The local physician contended that the disease was not smallpox, and as a result the disease has become scattered along the line of the Memphis & Fort Scott and cotton belt railroads and many neighboring towns are now infected.

COLORADO.—Denver, 167,000, Dec., '98: Total deaths, 185; under 5 years, 30; annual death rate per 1,000, 13.2; from typhoid fever, 1; phthisis, 52; acute respiratory diseases, 28.

CONNECTICUT.—167 towns, 892,110, Dec., '98: Total deaths, 1,227; under 5 years, 247; annual death rate per 1,000, 16.5; from typhoid fever, 22; diphtheria, 35; phthisis, 117; acute respiratory diseases, 187.

New Haven, 112,000, Dec., '98: Total deaths, 178; under 5 years, 30; annual death rate per 1,000, 18.2; from typhoid fever, 2; diphtheria, 2; phthisis, 25; acute respiratory diseases, 30.

Hartford, 80,000, Dec., '98: Total deaths, 114; under 5 years, 27; annual death rate per 1,000, 16.2; from typhoid fever, 6; diphtheria, 8; phthisis, 11; acute respiratory diseases, 2.

Bridgeport, 65,000, Dec., '98: Total deaths, 94; under 5 years, 29; annual death rate per 1,000, 17.1; phthisis, 11; acute respiratory diseases, 20.

Waterbury, 45,000, Dec., '98: Total deaths, 58; under 5 years, 20; annual death rate per 1,000, 15.7; diphtheria, 2; phthisis, 6; acute respiratory diseases, 9.

DISTRICT OF COLUMBIA, 280,250, 4 weeks, Jan. 28, '99: Total deaths, 543; under 5 years, 146; annual death rate per 1,000, 25.1; from typhoid fever, 9; diphtheria, 13; phthisis, 53; acute respiratory diseases, 99.

ILLINOIS.—Chicago, 1,619,226, Dec., '98: Total deaths, 1,849; under 5 years, 568; annual death rate per 1,000, 14.0; from typhoid fever, 55; diphtheria, 77; phthisis, 200; acute respiratory diseases, 391.

INDIANA.—Reports by the secretary from sixty-four counties to the State Board of Health, for January, indicate an increase in area of prevalence over the preceding month of influenza, pneumonia, bronchitis, tonsilitis, pleuritis, scarlet fever and measles. The diseases, which apparently decreased in area of prevalence,

were typhoid fever, intermittent fever, erysipelas, inflammation of bowels, diphtheria and croup and puerperal fever. The deaths from pulmonary consumption increased about 20 per cent.

IOWA.—Dubuque, 45,000, Dec., '98: Total deaths, 37; annual death rate per 1,000, 10.0; diphtheria, 4; phthisis, 9; acute respiratory diseases, 3.

Davenport, 36,000, Dec., '98: Total deaths, 55; annual death rate per 1,000, 18.5; from diphtheria, 3; phthisis, 3; acute respiratory diseases, 10.

LOUISIANA.—An important decision ("Item"), January 27: Judge Monroe yesterday sustained the State Board of Health's exception of no cause of action and dismissed from court the suit of the French Steamship Navigation Company against the board and its individual members in solido for $10,000 damages, alleged to have been sustained by the plaintiffs because of the refusal of the State Board of Health to allow the steamship *Brittania* to land 400 Italian immigrants in or near this city during the yellow fever last September, this action of the State Board of Health forcing the *Brittania* to depart hence and land her passengers at Pensacola at an extra cost of $10,000 to the plaintiff company.

MARYLAND.—Baltimore ("Herald"), January 25.—Health Commissioner C. Hampson Jones yesterday afternoon completed his annual report. The report shows that in 1898 there were 10,385 deaths in the city, as compared with 9,529 in 1897. The death rate per 1,000 was 19.19. This rate was calculated on a basis of 541,000 population, the basis formerly used being 506,398. The deaths from diphtheria in 1898 numbered 412, and in 1897 they numbered 362, but the deaths last year were greatly less in proportion to the largely increased number of cases. Deaths from pneumonia during the year were unusually numerous and are held largely responsible for the death rate of 19.19. In 1897 this disease in its commonest form caused 669 deaths, while in 1898 it caused 889. The epidemic of la grippe last fall contributed considerably to the total of pneumonia deaths, the first disease terminating frequently in the more serious one.

Tuberculosis, or consumption, is held in the report to be a preventable disease and the department wants the power to battle with this ailment on the lines now followed in London and New York and other cities, but cannot do so with its present force of workers.

Typhoid fever caused 189 deaths, exactly the same as in 1897. A few of the deaths of 1898 were, however, of imported cases of the disease. The increase in diarrhœal diseases was due to infected water. He urges the necessity of purifying the water, and adds: "An increase in the pollution is clearly shown by the examinations made by the department's bacteriologist and chemist." He dwells on the need of a general sewerage system, which is a disgrace to the city.

MASSACHUSETTS.—Boston, February 6.—School sanitation is now being prosecuted with unusual vigor to prevent the spreading of contagious diseases among the pupils of the public schools. There are hundreds of them out of school on account of contagious diseases, and the school houses are now in process of being scrubbed from top to bottom and then disinfected. Of infectious diseases during the last weekly report there were of diphtheria 50 cases, 4 deaths; scarlatina 4 cases, 1 death; typhoid fever 3 cases, 3 deaths; measles 150 cases.

Consumption Prevention-Purblindness.—To ascertain whether the Boston Health Department would commence to adopt any such remedies as those now pursued in New York a "Post" reporter visited the Health Department a short time ago and had an interview with one of the officials.

He said: "We hardly need to adopt the methods of New York, because there is no need for it. The conditions in this city for checking consumption or treating it are far more favorable than those of New York. We have not such thickly populated sections, and such parts of the city as might be classed as such do not compare in area with similar districts in New York.

"Then again we have more hospitals where consumption is solely treated. The city has one at Long Island, and the State another at Rutland, Mass. Besides these two, where Boston people can go if they desire to do so, there are private institutions such as the Free Home at Quincy street, Dorchester, and the Cullis Home, on Blue Hill avenue, Dorchester.

"No, we have no need to follow the New Yorkers. There exists no reason why we should, and if we did, it would only mean the inflicting of added hardship to families, members of which are cognizant of their having the diseases, but are obliged to work to support their families.

"We follow the disease very closely, but to a very great extent we rely on the aid and assistance of all physicians in properly ad-

vising the people to take precautions against inviting the disease to their homes or working places."

Lawrence.—Typhoid fever is reported (Boston "Herald," January 22) to be more prevalent than at any time during the past eight years. Feb. 3d.—The Water Board this morning received a reply from the State Board of Health relative to the analysis of the city water supply. In consequence of the epidemic of contagious diseases, especially typhoid fever, this winter, the board was desirous of ascertaining facts about the purity of the water.

The communication from Secretary Samuel W. Abbott, of the State Board, was as follows:

"From the 1st of December to the 10th the water was of ordinary winter quality. From the 11th through the month to the 3d of January the chemical examination shows increased number of the water, but the bacteriological examination show increased number of bacteria, which reached its height about the 24th of December, and gradually decreased to the normal condition of January 3d, since which time the number has varied very little from the usual condition in winter.

"In the judgment of the board, the filter is now efficiently purifying the water, and whatever effect the increased number of bacteria may have had, the condition which now exists is one in which the water may be safely used for domestic purposes.

The Worcester street railroad authorities have made a very striking move in setting up a plant for disinfecting the street cars so as to kill all bacteria and prevent the spread of contagion. Philadelphia has already put the idea into practice, and the Health Board of that city declares that it is beneficial. The disinfectant is a gas generated and applied in the car barns."

MICHIGAN.—2,176,596, Dec., '98: Total deaths, 2,341; under 5 years, 480; annual death rate per 1,000, 11.9; from typhoid fever, 31; diphtheria, 50; phthisis, 215; acute respiratory diseases, 268.

Thirteenth annual report of the registration of vital statistics for the year 1896, by the Secretary of the State, edited by Cressy L. Wilbur, M. D.: Marriages, 18,897; births (exclusive of 1,254 still births), 46,302; deaths, 21,983. Rates per 1,000 population, respectively, 16.3, 20.0, 9.5. The gross number of deaths was 21,983, of which number 17,521 were ascribed to various diseases. To dangerous communicable diseases, 4,258; consumption, 2,093; other tubercular diseases, 191; marasmus, 76; tubercular menin-

gitis, 32; scrofula, 16; tabes mesenterica, 46; other forms of tuberculosis, 21; diphtheria, 649; croup, 211; membranous croup, 51; erysipelas, 62; puerperal fever, 46; scarlet fever, 106; typhoid fever, 539; typho-malarial fever, 14; typhoid fever, 2; measles, 121; German measles, 1; smallpox, 13; chicken-pox, 1; whooping-cough, 158.

Detroit, 237,798, Dec., '98: Total deaths, 342; under 5 years, 91; annual death rate per 1,000, 15.0; from typhoid fever, 2; diphtheria, 12; phthisis, 26; acute respiratory diseases, 42.

At a regular meeting of the Michigan State Board of Health, January 13, 1899, the following preambles and resolutions were unanimously adopted:

Whereas, It is eminently desirable that reliable vital statistics shall be collected by the next United States Census, and

Whereas, The system to be followed should be in accord with the most progressive methods observed in several of the States:

Resolved, That the Representatives and Senators from Michigan be requested to lend their assistance in securing such correct vital statistics in non-registration States as may be possible;

Resolved, Furthermore, that the appointment of Dr. Cressy L. Wilbur, the present efficient Chief of the Michigan Vital Statistics, be urged as Chief Vital Statistician of the next United States Census.

[Attest.] FRANK WELLS, President,
HENRY B. BAKER, Secretary.

LANSING, Mich., January 20, 1899.

MISSISSIPPI.—Jackson, January 24.—Dr. H. A. Gant, Inspector of the State Board of Health, returned to-day from a trip through the eastern part of the State, where he has been investigating reported cases of smallpox.

Dr. Gant stated that he found a large number of cases of the disease scattered through the district, principally in Russellville, Enterprise, Wauthubbee, Cartersville, Orange, Lumberton, Ellisville and Hattiesburg. At the latter place seventeen cases are now confined in the pest house. The patients have all been isolated, and the Board of Health orders all people living in the infected parts to be vaccinated. Smallpox has prevailed in this section of Mississippi for nearly a year, and soon after being stamped out at one place it breaks out at another. The Board of Health traces the infection to Alabama, which State in turn claims to be fed from Tennessee, Georgia and other States. In a letter to Secre-

tary Hunter, of the Mississippi Board, Dr. W. H. Sanders, State Health Officer of Alabama, admits that smallpox now exists in Washington, Greene, Hale, Maringo, Parker, Clay and Randolph counties in that State.

MINNESOTA.—St. Paul, 215,582, Dec., '98: Total deaths, 139: under 5 years, 32; annual death rate per 1,000, 8.7; from typhoid fever, 3; diphtheria, 5; phthisis, 19; acute respiratory diseases, 22.

Minneapolis, 225,602, Dec., '98: Total deaths, 185; under 5 years, 61; annual death rate per 1,000, 9.0; from typhoid fever, 5; diphtheria, 6; phthisis, 17; acute respiratory diseases, 36.

MISSOURI.—St. Louis, 623,000, Dec., '98: Total deaths, 841; under 5 years, 220; annual death rate per 1,000, 16.0; from typhoid fever, 12; diphtheria, 27; phthisis, 96; acute respiratory diseases, 126.

Kansas City, 200,000, Dec., '98: Total deaths, 239; under 5 years, 61; annual death rate per 1,000, 14.3; from typhoid fever, 2; diphtheria, 4; phthisis, 8; acute respiratory diseases, 26.

NEW JERSEY.—The Secretary of the State Board of Health reports for the year ending June 30, 1898: Births, 32,515; deaths, 27,337; rates per 1,000 population, respectively, 17.96, 15.11—2.85 lower than in 1897, and the lowest on record. Estimated population, 1,810,008. Deaths from contagious diseases for 1897 and 1898, showing the diminished mortality: remittent fever, 131, 82-50; typhoid fever 478, 450-28; scarlet fever 203, 201-2; whooping-cough 321, 155-166; diphtheria 1,382, 950-432; erysipelas 68, 58-10; diarrhœal diseases of children 3,450, 2,958-452; consumption 3,237, 3,225-12; acute lung diseases 4,039, 3,414-625; brain and nervous diseases of children 1,809, 1,642-167; diseases of heart and circulation 2,475, 2,286-189; renal and cystic diseases 1,752, 1,684-58; cancer 857, 852-5; acute rheumatism 69, 55-14; puerperal diseases 278, 264-14; digestive and intestinal diseases 1,572, 1,484-88. Increased mortality: Measles 156, 195+39; adult brain and spinal diseases, 2,532, 2,700+168; puerperal diseases 278,, 264+14; measles 156, 195+39.

Newark, 235,000, 4 weeks, January 28, '99: Total deaths, 408;

under 5 years, 179; annual death rate per 1,000, 22.0; from typhoid fever, 1; diphtheria, 18; phthisis, 48; acute respiratory diseases, 91.

Paterson, 113,924, Dec., '98: Total deaths, 191; under 5 years, 69; annual death rate per 1,000, 16.8; from typhoid fever, 5; diphtheria, 8; phthisis, 17; acute respiratory diseases, 42.

NORTH CAROLINA.—Twenty-four towns, 158,288, Dec., '98: Total deaths, 170; under 5 years, 49; annual death rate per 1,000, 12.8; from typhoid fever, 2; phthisis, 26; acute respiratory diseases, 18.

Asheville, 13,000, Dec., '98: Total deaths, 19; under 5 years, 3; annual death rate per 1,000, 17.5; from phthisis, 3; acute respiratory diseases, 4.

Charlotte, 26,153, Dec., '98: Total deaths, 25; under 5 years, 15; annual death rate per 1,000, 11.5; from diphtheria, 0; phthisis, 0; acute respiratory diseases, 2.

Raleigh, 16,000, Dec., '98: Total deaths, 15; under 5 years, 6; annual death rate per 1,000, 17.9; from phthisis, 5; acute respiratory diseases, 1.

Wilmington, 26,500, Dec., '98: Total deaths, 41; under 5 years, 11; annual death rate per 1,000, 18.6; from phthisis, 5; acute respiratory diseases, 4.

OHIO.—Sixty-five towns, 1,214,579, 4 weeks, Dec. 31, '98: Deaths from typhoid fever, 141; diphtheria, 37; scarlatina, 8.

Cincinnati, 405,000, Dec., '98: Total deaths, 535; under 5 years, 110; annual death rate per 1,000, 15.8; from typhoid fever, 21; diphtheria, 2; phthisis, 67; acute respiratory diseases, 89.

Cleveland, 370,000, Dec., '98: Total deaths, 496; under 5 years, 146; annual death rate per 1,000, 16.0; from typhoid fever, 22; diphtheria, 20; phthisis, 22; acute respiratory diseases, 75.

Columbus, January 31.—The annual report of Bacteriologist John D. Dunham, of the City Department of Health, shows that during the year 146 samples of water were examined, of which 66 were reported usable, 41 suspicious, 41 impure, and 3 were reported contaminated with intestinal bacteria. The results show that about 55.4 per cent. of waters analyzed are either suspicious or impure, which fact indicates that practically all such water is a source of danger to those persons who use it for drinking purposes.

PENNSYLVANIA.—Philadelphia, 1,266,832, 4 weeks, Jan. 28, '99: Total deaths, 2,459; under 5 years, 626; annual death rate per 1,000, 25.6; from typhoid fever, 117; diphtheria, 94; phthisis, 273; acute respiratory diseases, 504.

Contagious Diseases.—The annual report of Medical Inspector J. Howard Taylor, M. D., besides dealing with the question of contagious diseases, goes over the condition of the public schools. The report on contagious diseases is as follows:

I have the honor to report 4,154 cases of diphtheria, 261 cases of membranous croup, 1,900 cases of scarlet fever, 6,097 cases of typhoid fever and 7 cases of smallpox for the year 1898.

There was a decrease of 877 cases of diphtheria, 113 cases of membranous croup, 1,653 cases of scarlet fever and an increase of 3,103 cases of typhoid fever. There were 998 deaths from diphtheria, 156 deaths from membranous croup, 114 deaths from scarlet fever, 639 deaths from typhoid fever and 2,590 deaths from consumption.

The typhoid fever cases reported in 1898 more than doubled those of the preceding year. The soldier cases are inculded in making up the total cases. Excluding the soldiers, who numbered 1,348, we have 4,749 as the total city cases. This marked increase in typhoid cases makes it imperative that means should be promptly taken to mitigate this scourge.

The report on the schools in the forty districts shows that a great many of the buildings are in bad sanitary condition and that the light and ventilation, especially in the older buildings, are very bad.

Public school examinations have been extended this year, to include, in addition to the annual inspection of school buildings, the health of the pupils, in conformity with the following instruction issued by the Board of Health:

"The assistant medical inspectors are required to visit daily two schools in their districts, and to report daily to the chief medical inspector the names of the schools visited. They shall cause to be excluded from school all pupils showing symptoms of any contagious disease, more especially the following: Diphtheria, measles, whooping-cough, scarlet fever, croup, chicken-pox, mumps, contagious eye diseases, parasitic diseases of the head and body, offensive otitis media, or any illness which, in their judgment, shall require the pupil to be excluded from school."

In connection with these daily inspections certain disinfections are done if a contagious sickness is found in the school, and as the

co-operation of the Board of Education has been secured it is believed that more efficient sanitary work will be done hereafter.

Obstructing Filtration.—While the Board of Health ("Public Ledger," February 4) is issuing circulars to citizens warning them against the polluted water furnished to their homes, and instructing what measures to take to lessen the dangers attendant upon drinking the foul stuff as furnished from the city reservoir, Councils continue to trifle with the subject of filtration. Select Council, by a tie vote, prevented the adoption of the resolution of Common Council intended to put an end to private schemes of spoliation. The men who oppose filtration by the city, because that would put an end to the schemes of jobbers, were given aid and comfort by other members of Councils, who, though more honest, have pet schemes of their own, and set their opinions up against those of experts and the experience of many cities as to the value of filtration.

Pittsburg, 305,000, 4 weeks, Jan. 28, '99: Total deaths, 612; under 5 years, 202; annual death rate per 1,000, 25.8; from typhoid fever, 29; diphtheria, 11; phthisis, 22; acute respiratory diseases, 164.

Report for the Year 1898.—There were 1,777 cases of typhoid fever, 476 cases of diphtheria and 391 cases of scarlet fever. Deaths due to typhoid fever numbered 218, to pneumonia 622, diphtheria 89 and scarlet fever 24. Deaths from other causes were: Consumption 337, whooping-cough 167. The total number of deaths during the year was 5,114.

As for typhoid fever, the record for 1898 put many preceding years to blush. Over 1895 the increase was 184; over 1896, 561; and over 1897, 493. There was a slight decrease in the number of cases of diphtheria from the preceding three years. Against 587 cases in 1895, 608 cases in 1896 and 583 cases in 1897, there were only 476 cases last year. Scarlet fever was on the increase last year, there being 391 cases. In 1895 there were 1,203 cases and in 1896, 494; and 1897, 293.

South Carolina.—Charleston, 65,165, 4 weeks, Jan. 28, '99: Total deaths, 133; under 5 years, 32; annual death rate per 1,000, 26.5; from typhoid fever, 1; phthisis, 14; acute respiratory diseases, 12.

Smallpox is reported (January 21) prevalent in Florence and that not less than 45 cases exist in Sumter county.

Chain Gangs and Sanitary Purposes.—A bill has been introduced in the Legislature of South Carolina authorizing the County Board of Commissioners, in their discretion, to utilize the coun-

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ty chain gang in whole or in part in any kind of work calculated to promote or conserve public health in the county or in any community thereof in which the sentences of the convicts in such gang were pronounced.

WASHINGTON.—Seattle, 70,000, Dec., '98: Total deaths, 55; under 5 years, 10; annual death rate per 1,000, 9.4; from typhoid fever, 2; diphtheria, 4; phthisis, 8; acute respiratory diseases, 6.

WISCONSIN.—Milwaukee, 280,000, Dec., '98: Total deaths, 330; under 5 years, 119; annual death rate per 1,000, 13.9; from typhoid fever, 5; diphtheria, 10; phthisis, 32; acute respiratory diseases, 50.

CUBA.—Habana, January 7.—Sanitary Inspector Brunner reports to Surgeon-General Wyman: The death rate continues to decrease. This is due to the almost complete disappearance of the Spanish Army and some efforts to make the city mechanically clean. The only death from yellow fever in the week occurred in the ranks of the sick Spanish soldiers. The deaths from all preventable diseases show an encouraging decrease. There is an increasing number of cases of grip, and cases are reported on some of the vessels now lying in the harbor.

It would be well to state here, in view of the fact that bills of health are issued to vessels of the Navy on the statements of their medical officers and without inspections of the ships or crews.

PUERTO RICO.—San Juan, January 5.—Surgeon Glennan reports to the Surgeon-General regarding that city: The average width of the streets is 25 feet, with a cement footwalk upon either side, leaving a stone-paved roadway of 17 feet. At least two-thirds of the streets have a fairly steep descent to the water fronts —equal to the incline of the streets leading down from the Capitol at Washington. Heavy and frequent showers of rain wash them, and there are no cleaner looking streets in the United States. This is the superficial view. In the rear courts there are between 1,300 and 1,500 pits and cemented vaults, which have not been emptied for years and whose condition is indescribable. They are located next to kitchens and cemented cisterns, and the heavy rainfalls overflow them so that the back courts and areaways are covered.

The water supply of the city at present depends upon these cisterns. Many sewer and water pipes have been laid, and a good water supply system was projected by the municipal authorities. A pumping station, filter beds and reservoir are constructed at Rio

Piedras, twelve kilometres from San Juan, and many large water mains laid, but the work was interrupted by the war. An excavation has been started within the city heights for a reservoir. I have recommended that it be abandoned and standpipes used instead, for the reason that they are less expensive and, principally, that they expose less surface to a tropical sun, besides less danger of animal and vegetable pollution.

General Henry has designated Dr. Azel Ames, of Boston, a contract surgeon and well-known sanitarian, to establish a vaccine farm and organize a large system of vaccination for the island.

ONTARIO.—Toronto, February 1.—The Provincial Board of Health assembled for its quarterly meeting at the office of the secretary yesterday afternoon, Dr. Macdonald, Hamilton, presiding. There were also present Drs. Kitchen, St. George; Vaux, Brockville; Cassidy, Toronto; and Bryce, secretary.

The secretary reported upon the outbreak of *smallpox* in the Irish creek district, and also that no new cases have been reported, but that he had that day received advices that four new cases had developed in St. Telesphore, Quebec, just across the river from Hawkesbury, in the same house from which a case had previously been reported. Eleven cases have been reported in Ontario during the last three months, of which eight have recovered, one died and two are still sick. The two cases which are still under treatment are at North Colchester and East Hawkesbury.

The past year has been marked by remarkable activity in different countries as well as in the Province in the progress of the movement for suppressing the prevalence of *tuberculosis*. This has taken two directions, the one, the establishment of *sanatoria* for treatment and notification of cases; and the second has been the renewal of the crusade against milk and its products, which may carry the germs of tuberculosis.

English public opinion, so conservative, so slow to be aroused to action, yet so characteristically practical when aroused, has during the past year, years after France, Germany and Denmark had instituted practical measures for dealing with the disease, developed an activity positively surprising. By far the most advanced in its systematic municipal sanitation—which in England has in thirty years caused the mortality from consumption to be reduced 50 per cent., and has resulted in a death rate in that densely populated country of but 1.3 in the 1,000, or lower in 1896 than Ontario in 1897—the English people, led by his Royal Highness the Prince of Wales, have declared that tuberculosis is a disease which

can be prevented, and, therefore, must be, and a national association with him at its head has been formed to aid municipal establishment of local sanatoria for its treatment. But more than this, they have by a royal commission, based on experimental evidence, declared that the dairy is a fruitful source of this disease; and experimenters are there daily accumulating further evidence of its truth.

Sanatoria for Consumptives.

Referring to the remarkable development of the problem within the last year in England and on the continent, the report pointed out how the development in Germany had taken place in consequence of the practical use being made of the consumptive sanatoria, by the workmen's insurance societies. A brief sketch of the societies was given, in which it was shown that in them $7,300,000 was spent as the cost of medical attendance and medicine in a single year, and that $21,300,000 was the actual cost of sickness paid out in sick benefits by these associations. The associations having observed how in the first sanatoria early consumptive cases had been cured seized the idea that if the disease can be cured it is better for their funds that they pay the cost of maintaining sick work people insured by them in these sanatoria than to pay death claims. So successful has the treatment proved that, as the report states, over $1,000,000 was spent in 1898 alone for the construction of sanatoria and maintenance of patients in them by the insurance associations alone. The report of one of the largest of these on 1,541 patients treated shows than general improvement took place in 85 per cent., and complete restoration of working capacity in 71.8 per cent. The time which these companies are required to maintain a sick patient is a minimum of thirteen weeks. Their physicians thus are required to report consumptives at the earliest moment they are seen. The report urges that if such results are obtainable in Germany equally good results ought to be obtained for the thousands insured in our friendly and other insurance societies in Ontario, where, as the reports state, probably more than a third of all deaths in them are due to consumption.

NEW BRUNSWICK.—Fredericton, February 1.—The annual meeting of the Provincial Board of Health was held last evening at the office of the secretary, Dr. G. E. Coulthard.

The reported outbreak of smallpox among the emigrants recently landed at Halifax was referred to and talked over at some length and a resolution adopted urging vaccination.

The alarming prevalence of consumption and tuberculous dis-

eases and the recently discovered methods of successfully treating that dread malady, and the possibility of preventing its spread was quite fully discussed. The present activity in England, the United States and in Ontario in providing sanatoria and other modern methods of treating tuberculous diseases was noted, and the opinion was freely expressed that the time had arrived when a sanitorium was needed in the lower provinces. As a first step toward concerted action along this line it was felt that an association should be formed for all who are deeply interested in this subject, and resolutions were adopted for the promotion of such action.

CITY OF MEXICO, 344,377. For the month of December, 1898: Total mortality, 1,357; annual death rate per 1,000, 37.28; deaths from tuberculous affections, 147; acute bronchitis, 117; pneumonia, 129; bronco-pneumonia, 47; pulmonary congestion, 25; typhus fever, 28; diarrhœa enteritis, 214; infantile diarrhœa, 9.

BUENOS AYRES, 762,425, Nov., '98: Total deaths, 1,228; under 5 years, 577; annual death rate per 1,000, 19.3; from typhoid, 8; diphtheria, 17; phthisis, 125; acute respiratory diseases, 209.

THE ENGLISH BIRTH RATE.—The London "News" observes that those who have inferred from recent events that there are tendencies likely to lower the birth rate of the country will not find much encouragement in the latest return of the Registrar General In the first nine months of the current year that rate has, in England and Wales, averaged 29.8, which compares with 29.7 both for last year and the year before. Very steadily the population is increasing. During the first three-quarters of the present year, for which figures are this week available, 699,153 births were registered in England and Wales alone, and only 419,587 deaths, showing an excess of births over deaths of no fewer than 279,566. The population of England and Wales has in round numbers increased from twenty-eight millions in 1888 to thirty-one millions in 1898 One fact is not easily explained. Usually there are more births in the first half than in the second half of the year. To that rule there has been only one exception in the last ten years, that being in 1896. There may, however, soon be another, as the births in the third quarter of this year exceeded those in either the first or second quarter. But why the balance should generally be in favor of the first half of the year is a point of some interest, second only in importance perhaps to that on which Professor Schenk has speculated so much.

BOOK REVIEWS.

THE MICROSCOPY OF DRINKING WATER. By GEORGE CHANDLER WHIPPLE, Biologist and Director of Mt. Prospect Laboratory, Department of Water Supply, Brooklyn, N. Y.; formerly Biologist of the Boston Water Works.—x + 338 Pages. 8vo. Cloth. $3.50. Figures throughout the text and 19 full-page half-tones. Order through your bookseller, or copies will be forwarded, postpaid, by the publishers on the receipt of the retail price. New York: John Wiley & Sons. London: Chapman & Hall, Limited.

This book, the author tells us prefatorily, has a twofold purpose. It is intended primarily to serve as a guide to the water-analyst and the water-works engineer, describing the methods of microscopical examination, assisting in the identification of the common microscopic organisms found in drinking water and interpreting the results in the light of environmental studies. Its second purpose is to stimulate a greater interest in the study of microscopic aquatic life and general limnology from the practical and economic standpoint.

Though elementary in character, it is comprehensive. Principles are stated and briefly illustrated without any attempt to present even a summary of the great mass of data that has accumulated upon the subject during the last decade. The illustrations are, for the most part, from biological researches made at the laboratory of the Boston Water Works and from the reports of the Massachusetts State Board of Health. Hence, in considering them, the reader is reminded that the environmental conditions of the Massachusetts water supplies are not universal, and that every water supply must be studied from the standpoint of its own surroundings. So far as the microscopic organisms are concerned, however, the troubles that they have caused in Massachusetts may be considered as typical of those experienced elsewhere. The organisms chosen for description are those that are most common in the water supplies of New England, and those that best illustrate the most important groups of microscopic animals and plants. In many cases whole families and even orders have been omitted, with the apparent purpose of bringing the field of microscopic aquatic life within the scope of a practical and elementary survey. But the illustrations and descriptions are complete enough to enable the

general reader to obtain a true conception of the nature of the microscopic life in drinking water and to appreciate its practical importance.

The illustrations, for the greater part, have been drawn from living specimens or from photo-micrographs of living specimens, but some of them have been reproduced from and are credited to standard authorities.

The work is divided into two parts. Part I begins with a historical chapter, giving an account of early investigations and the data of improvements. Sanitary analyses and explanations and the different methods of microscopical examination follow. Micro-organisms in water from different sources; limnology—physical properties of water, thermal stratification, seasonal changes, bleaching, etc.; geographical distribution of micro-organisms; odors in water supplies, storage; growth of organisms in water supplies.

Part II treats of the classification of micro-organisms, diatomaceæ, schizomycetes, cyanophyceæ, chlorophyceæ, fungi, protozoa, rotifera, crustacea, bryozoa, spongidæ, miscellaneous organisms, altogether well arranged, admirably gotten up and of great practical utility.

CHRISTIAN SCIENCE, A SOCIOLOGICAL STUDY, the subject of an address delivered, on invitation, before the Northwestern Ohio Medical Association, at Lima, O., December 8, 1898, by C. A. L. REED, A. M., M. D., of Cincinnati, by resolution of the association, has been issued in pamphlet form for general circulation. Dr. Reed is among the foremost of the medical profession in Ohio and a leader in the spirited effort to drive all sorts of quacks from the State. This address is a lucid exposure of the sacriligious fanaticism of which it treats and worthy of the widest possible distribution. It is published at a nominal price, that it may be purchased in quantity for free distribution by all who would by this means aid in suppressing the wicked impostors who make use of the sacred name "Christian" as a means of robbing and even murdering, in many cases, their dupes. Ten cents a copy. McClelland & Co., Cincinnati, O.

THREE THOUSAND QUESTIONS ON MEDICAL SUBJECTS, ARRANGED FOR SELF-EXAMINATION.—A three by five-inch pocket reference book for medical students. Ten cents a copy. P. Blakiston's Son & Co., Philadelphia.

MUNICIPAL FUNCTIONS.—A study of the Development, Scope and Tendency of Municipal Socialism. By MILO ROY MALTBIE, Ph. D. Price 25 cents. New York: Reform Club, Committee on Municipal Administration, 52 William street.

The December number, Vol. II, No. 4, of "Municipal Affairs." Pp. 233. "As the basis for this monograph, scheduled inquiries were prepared over a year ago, which after being condensed to the utmost, made a pamphlet of twenty-five pages. The State Department was consulted and its co-operation secured in the way of a letter to ambassadors, ministers and consuls. A question schedule with full letter of explanation and return postage (in the stamps to be used) was sent to the authorities of each city of considerable size, to the United States representatives abroad and to missionary and trade stations, in short to every local source from which we could hope to get information. The returns have been surprisingly full and have covered 150 American and 350 foreign cities."

The subject is admirably systematized and considered in three parts: Evolution of the City; Present Activities and Tendency Toward Municipal Socialism, sub-divided into chapters dealing with the details of municipal development and conduct.

REPORT OF THE COMMISSIONER OF EDUCATION, 1896-97. Vol. 2: Parts II. and III. Pp. 1,260. Washington, D. C.: Govern ment Print. This volume begins with a historical sketch of "Federal and State Aid to Higher Education," the cultivation and promotion of higher education from the time of the "university grant" connected with the "ordinance of 1787," with a summary of Federal aid for the establishment of higher institutions of learning in the several States and Territories.

The First Common Schools of New England is the subject of a special chapter by George Gary Bush, Ph.D., and next following this a chapter on the Learned Professions and Social Control, by Mr. Wellford Addis (specialist in the Bureau), giving in detail the required qualifications by the several States from those who are licensed to practice medicine and law.

Eskimo Vocabularies; Educational matters of interest in various States; foreign universities; consular reports on educational topics; current questions; growth of Toronto children; education in Alaska; institutions for higher education; agriculture and mechanical colleges; normal schools; commercial and business schools; manual and industrial training schools; education of the colored race; schools for the defective classes and statistics of

schools, foreign as well as domestic, are the significant titles of as many chapters, all replete with information.

ANNOUNCEMENTS.

THE INTERNATIONAL MEDICAL ANNUAL, 1899, seventeeth year, 8vo, cloth, about 700 pages, is now in press. It includes a series of articles intended to bring the reader's knowledge up to date on subjects of modern investigation, and the present volume contains new matter of practical interest concerning almost every known disorder. The "Annual" is now a standard work of reference in all parts of the world, and we feel some pride in asserting that no medical work of such a widely international character has been previously issued by the medical press in any country which offers so much at so small a price. We respectfully ask the continued patronage of the profession, that we may thus still further extend the "Annual's" circulation and usefulness. Price $3 net, post or express paid. E. B. TREAT & Co., Publishers, 241-243 West Twenty-third street, New York.

The Open Court Publishing Company have now in press the "Principles of Bacteriology," by Prof. Ferdinand Hueppe, of the University of Prague, translated by Prof. E. O. Jordan, of the University of Chicago. This volume is the most scientific and rigorous manual of bacteriology that has yet been written. It treats its subjects as a connected science rather than as a collection of loose data; it explodes many popular and professional prejudices on the subject, and is especially strong on its philosophical side. Pp. 475. Price, $1.75. 28 woodcuts and colored plates. Chicago: The Open Court Publishing Co.

CONTEMPORARY LITERATURE.

THE BEST AIR TEMPERATURE.

The conditions affecting the temperature of the body other than those due to physiological conditions are very numerous. First and most obvious is the temperature of the surrounding atmosphere. It is a well-established fact that an average temperature of the air of 54° F. is best adapted to the public health, for at that temperature the decomposition of animal and vegetable matter is slight; and normal temperature is most easily maintained. Every degree of temperature above or below that point requires a more or less effort of the heat-regulating power to maintain the proper

equilibrium. Even more potent in elevating the bodily temperature is the introduction into the blood, whether by respiration or by direct injection, of putrid fluids and the gases of decomposing matters. If this injection is repeated at short intervals, death will occur with a high temperature. The air of cities contains emanations, in hot weather, from a vast number of sources of animal and vegetable decomposition, and the inhalation of air so vitiated brings in contact with the blood these deleterious products in a highly divided state which cause a fatal elevation of temperature in the young, old and enfeebled. The same effect is produced by the air in close and heated places, as in tenement houses, workshops, schoolhouses, hospital wards and other rooms where many persons congregate for hours. . . . It will not now be difficult to understand in what manner high temperature affects the public health of large cities. Evidently in the *direct* action of heat upon the human body we have the most powerful agency in the production of our great summer mortality. While sunstroke represents the maximum direct effect of solar heat upon the human subject, the large increase of deaths from wasting chronic diseases and diarrhœal affections of children under one year of age and persons upward of seventy years of age, shows the terrible effects of the prevailing intense heat of summer upon all who are debilitated by disease or age and thereby have their "heat regulating power" diminished. The fact has been established by repeated experiment that when solar or artificial heat is continually applied to the animal the temperature of its body will gradually rise until all of the compensating or heat-regulating agencies fail to preserve the equilibrium, and the temperature reaches a point at which death takes place from actual combustion. In general, a temperature of 107° F. in man would be regarded as indicating an unfavorable termination of any disease. In persons suffering from sunstroke the temperature often ranges from 106° F. to 110° F., the higher temperature appearing just before a fatal termination.—From "Vegetation a Remedy for the Summer Heat of Cities," by Dr. Stephen Smith, in "Appletons' Popular Science Monthly" for February.

CLIMATE AND CONSUMPTION.

I am in favor of treating tuberculous patients near their homes, and in the same or nearly the same climate as that in which they will have to live and work after their restoration to health. My reasons for advocating such principles are founded on the experi-

ences of all modern phthisio-therapeutists, who have demonstrated that the hygienic and dietetic treatment in special sanatoria is feasible and successful in nearly all climates. I know from personal observation that cures of pulmonary tuberculosis effected in our ordinary home climates, which are on the average not considered as especially favorable to this class of sufferers, have been more lasting and more assured than cures obtained in more genial climes. And, with all due deference to the opinions of others, I do not believe there exists any climate which has a special curative quality for any form of pulmonary tuberculosis. Climate can only be considered as a more or less valuable adjuvant in the treatment of consumption, but not a specific.—From "The Tuberculosis Problem in the United States," by S. A. Knopf, M. D., in "North American Review" for February.

THE SPANISH-AMERICAN WAR.

The last vestige of Spain's western empire has disappeared. The final expulsion of Spain from America and from the Philippines is the fit conclusion of the long strife between the people who stood for civil and religious freedom and those who stood for bigotry and tyranny as hideous in their action as any which have ever cursed humanity. The work has been a long one, but Spain at last is confined practically to her peninsula, where her people can do as they please with one another, but whence they can trouble the world no more. Spain has ceased to rule. Her once vast empire has gone, because she has proved herself unfit to govern, and for the unfit among nations there is no pity in the relentless world forces which shape the destinies of mankind.

We are prone to assign as the chief reasons for the war with Spain the cruel treatment of the Cubans and the destruction of our battle-ship in Havana harbor. At least the greater number of magazine and newspaper articles called forth by the war have discussed these causes as if they were alone responsible. It is natural that they should be most prominent, because they were the immediate causes and affected the United States directly. But the underlying causes of the war are as old as the United States itself, and have been steadily working toward the results achieved in the battles of Manila and Santiago for several centuries. In the February issue of "Harper's Magazine" appears the first instalment of a calm and unprejudiced history of the late war, written by Senator Henry Cabot Lodge.

Senator Lodge discusses in a concise and comprehensive manner the original causes of the war and the relations of Spain to the Anglo-Saxon race in the New World from the earliest colonial days. The conflict is not a new one. It began in Europe when England and Holland were allied against Spain, and; after the latter had been crippled in Europe, was transferred to the Western Hemisphere.

SQUIRREL INNS.

It is a dull winter when Bishop Potter doesn't say something that is worth disputing. His observation, at a recent meeting of the Church Temperance Society in New York, that the saloon is a social necessity, has already called out denials and discussion. It has brought up the question whether the chief attraction of the saloon is society or drink. Men who go to saloons because it is pleasanter there than at home may go to the squirrel inns which the Church Temperance Society proposes to start. Men who go to saloons to get a drink won't find that the squirrel inns serve their purpose. But in great cities there are all sorts of men and women who have use for all sorts of things, and if the squirrel inns are good temperance saloons, no doubt they will get their share of patronage. They do in Liverpool, where more than sixty of them do a profitable business, and a score of them flourish in Manchester. One is to be started at 131 Bowery, in premises which have been used for saloon purposes and found well adapted for that use. If it is well managed, it ought to flourish there. Drink is easily come by in the Bowery, but there is no surplus there of refuges from the street where simple entertainment may be had at small cost and without moral or physical detriment.—E. S. Martin, in "Harper's Weekly."

ALIMENTARY VALUE OF FISH.

The alimentary value of fish is indisputable. It is wholesome and nutritious, and in its wide range of quality and flavor affords gratification to the coarsest as well as the most refined palate. Moreover, in primary cost, it is the cheapest of flesh foods, and should, therefore, be the universal aliment, everywhere a staple dish upon the family board. To most, however, it is substantially a luxury. In many localities it is not obtainable fresh, and so falls into public disfavor. But even where presented in acceptable condition the accommodation is usually effected with difficulty and

expense, involving a corresponding limitation of sale. Thus it is that the consumer is dissatisfied, the dealer is not content, and the producer, the poor fisherman, rightly bewails his lot, for he profits least. It can be truthfully said that there is no branch of civilized effort wherein the producer receives so small a proportion of the ultimate or consumer's price as does the toiler of the sea for the unchanged product of his labor.—From "Our Fish Supply and Its Deficiencies," A. H. Gouraud, in "North American Review" for February.

A RESUME OF THE LAST CUBAN INSURRECTION.

There is no need to trace here the history of this last insurrection. The insurgents formed a government, carried on a vigorous guerilla warfare, and swept over the island from Santiago to the outskirts of Havana and Pinar del Rio, and soon held sway over most of the provinces outside the towns. They fought better and were better led by partisan chiefs like Maceo and Garcia than ever before. But the head and front of the rebellion was Maximo Gomez, a man of marked ability and singular tenacity of purpose. His plan was to refuse all compromises, to distribute his followers in detached bands, to fight no pitched battles, but incessant skirmishes, to ravage the country, destroy the possibility of revenue and win in the end either through the financial exhaustion of Spain or by the intervention of the United States, one of which results he believed must come if he could only hold on long enough. His wisdom, persistence and courage have all been justified, for the results have come as he expected, and the rest of the story is to be found in the course of events in the United States.—From "The Spanish-American War," by Hon. Henry Cabot Lodge, in "Harper's Magazine" for February.

A FRENCH TRIBUTE TO WASHINGTON.

Persons who are interested in the erection in Paris of a statue of Washington on horseback will be glad to learn that such a statue has been made by Daniel C. French, the scupltor, and is ready to cast. The National Society of the Daughters of the American Revolution, of which the officers are Mrs. Stephen J. Field, Mrs. Hobart, Mrs. Hearst and Mrs. James McMillan, undertook to give this statue to Paris and raised $22,000, which has been expended. Mr. French has done his work. It has been accepted by the Mu-

nicipal Art Commission of Paris, and an eligible site has been secured for it. All that is lacking now is $15,000 to pay for the casting and the pedestal. Contributions to this sum may be sent to Mrs. Robert S. Hatcher, Washington, D. C.—E. S. Martin, in "Harper's Weekly."

"LITERATURE."

Can a periodical devoted exclusively to the discussion of literary subjects be successful in the United States? That has been food for argument these twenty years now, and yet no paper has ever been sincerely launched upon the public that could be said to attempt this subject from a high standard. It is interesting to note the result of an experiment within the year by Messrs. Harper & Brothers upon this very matter. About a year ago this distinguished and conservative house made an arrangement with the proprietors of the "London Times" to issue a certain number of copies of "Literature" each week in this country. Whether the paper found its field or not no one but the Harpers could tell, but something has recently happened—within the last fortnight—which is certainly encouraging to the lovers of good literary criticism, because it seems to prove that there are enough readers in this country to make a weekly literary paper a success, for with this month of January the Harpers have decided to set up "Literature" in this country, to print it themselves, and while taking advantage of the English and European matter contained in the paper, to make it a really American journal by using more American material. The cover is changed vastly for the better, and we now have in this last year of the century a dignified, high-class, critical weekly for the American public. It is a literary event of no small importance.

In the February number of the "AMERICAN MONTHLY REVIEW OF REVIEWS," the editor seeks to apply the lessons of our national failures in the South during the reconstruction period following the Civil War to the present problems of a similar nature in Cuba, Porto Rico and the Philippines. His deductions are interesting and instructive. He says: "The true way to restore the South to the Union after the war was to restore the South to its own people." The same principle applies to-day in the new territories just coming under our control. The editor warns us against a new type of "carpet-bagger" who is threatening to invade Cuba—namely, the franchise grabber. A large proportion of space

in this number of the "Review" is given up to editorial and contributed articles on the management of foreign dependencies. Sylvester Baxter contributes an interesting study of the Dutch rule in Java and Dr. Daniel Dorchester make a statistical exhibit of the recent drift toward colonial and protectorate governments.

In "The Progress of the World" the editorial department deals this month with the new problems of colonial administration now confronting the country, with the Senatorial campaigns in the different States, with the polygamy question, with the question of army beef in its bearings on the reorganization of the War Department, with our recent industrial progress, protective tariffs, and the "trusts," and with the month's developments in foreign politics.

PHILIPPINE ARCHITECTURE.—According to Prof. Dean C. Worcester, the houses rest on four or more heavy timbers, which are firmly set in the ground. The floor is raised some five or ten feet from the ground. The frame is of bamboo, tied together with rattan, and nails are not used. The sides and roof are usually of palm, and the former may be made by splitting green bamboo, binding the halves flat and then sewing them together. If palms are scarce, the roof may be attached with long grass. The floor is usually made of bamboo strips with the convex side up. They are tied firmly in place in such a way that wide cracks are left between them. The houses are entered by ladders; in some cases there is only one room, and the cooking is done over an open fire built on a heap of earth in one corner, and as the opening for the exit of the smoke is inadequate, the room is sometimes rendered almost uninhabitable. In the better classes of dwellings the house is divided into several rooms, and there is a place partitioned off for cooking. There are windows which are provided with swinging shades. Prof. Worcester states that native dwellings which are properly arranged have much to recommend them. The ventilation is perfect and the air is kept much cooler than in a tightly closed building. The construction is so light that if they are thrown down by an earthquake or blown down by a typhoon no one is injured, as the material is too light to do any damage. The richer natives sometimes build houses of boards with galvanized iron roofs and limestone foundations, but they are very much more expensive and are pronounced decidedly less comfortable than the more humble dwellings which we have described.—"Scientific American."

THE SANITARIAN.

APRIL, 1899.

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SAND FILTRATION OF PUBLIC WATER SUPPLIES.*

BY R. S. LEA, Ma. E., Assistant Professor of Civil Engineering, McGill University, Montreal.

The present century is especially noted for the wonderful progress which has been made in scientific knowledge. None of the results are of more practical importance than the developments which have taken place in the facilities for transportation and for the transmission of power over long distances.

The direct outcome has been a continually growing tendency toward centralization in most industrial operations; which, in turn, has resulted in an increase in the number of people living in towns quite out of proportion to the total growth of the population. For instance, in the year 1790 there were but three towns in the United States with populations of 8,000 and over; and these comprised less than 4 per cent. of the whole number of inhabitants. In 1880 there were 286 such towns; ten years later the number had increased to 448, and these included about 30 per cent. of the total population. Again, in 1840, there were only three cities with populations as great as 100,000; in 1890 there were 30; while at the present time almost half the people in the country live in places with populations of at least 1,000.

These are figures which apply to the country at large. In certain districts, however, the percentages are much higher. For example, in the State of New Jersey, 52 per cent. of the people live in places of 8,000 or over, in Connecticut 54 per cent., in New York 60 per cent., and in Massachusetts 70 per cent. The last State, with a total population of about two and a half millions, has

*Read at meeting of Canada Society of Civil Engineers, Jan. 19, 1899.

40 cities of 10,000 and over, and 20 of 25,000 and over. In the countries of Europe the same conditions and tendencies obtain to even a greater degree.

These figures, derived from census reports, etc., are given in order to call attention to the magnitude and direction of this movement, which has taken place to any considerable extent only during the last few decades; but which has, nevertheless, practically created an important branch of engineering.

From this crowding together of people in restricted areas, in close proximity to industrial establishments, have arisen many new and complicated problems; among the most important of which are those connected with the maintenance of sanitary conditions of existence. Besides this, not only are these problems rapidly increasing in number and difficulty, but there is a growing appreciation of the danger of unsanitary surroundings, and consequently, of the necessity of having such matters properly dealt with.

In thickly populated districts and in the neighborhood of cities and towns the wastes of human life and human industry are a continual menace to the health of the inhabitants. Nature's method of preserving the balance between growth and decay, by utilizing animal waste as plant food, is no longer effectual. The lakes and streams begin to serve the double purpose of sources of water supply and receptacles for sewage. Hence it is evident that among the most urgent of the questions with which the municipal engineer may have to deal are those connected with the securing and maintaining of the degree of purity necessary in water intended for domestic use.

The proper methods to be employed in the accomplishment of this object depend as much upon biological as upon mechanical principles, so that a certain degree of familiarity with these principles and with the methods of the chemist and biologist will be necessary to the engineer engaged in such work, in order that he may be able to avail himself intelligently of their assistance.

European cities, having earlier felt the necessity, have devoted much more attention to these matters, and are consequently further advanced in their methods of dealing with them than is the case with the cities in America. Nevertheless, by far the most important series of investigations into the subject of the purification of water and sewage are those known as the "Lawrence" experiments, carried on under the direction of the Board of Health of the State of Massachusetts.

This Board, from its foundation in 1869, always devoted a great deal of attention to the condition of the water supplies of the State. In 1886, the time being particularly appropriate, it appointed a body of experts to the exclusive duty of conducting a series of observations and experiments, with the object of finding the best methods for purifying both water and sewage. These experiments are still in progress, and the annual reports of the department, giving the results of their investigations, are exceedingly valuable to engineers and others interested in such questions.

In Berlin and in a few other large European cities having water works departments provided with the necessary scientific equipment and management, many careful experiments have been made on the working of the large water-filter beds of the systems. The results of such experiments as these have an especial value from the fact that they are conducted on a large scale, and under conditions which exist in actual practice. On the other hand, these same circumstances render them less reliable as a means of determining the true principles upon which the process of filtration depends.

The object of this paper is to describe, as fully as reasonable limits will permit, first, the circumstances under which water supplies become polluted, and the nature of this pollution; and second, the process of purifying it again in large quantities by sand filtration.

Of course pure water is preferable to purified water; or, as has been said, with water "innocence is better than repentance." Unfortunately, however, water whose natural state is above suspicion is often exceedingly difficult to procure, except at a cost which is practically prohibitive. Consequently, many cities and towns, especially the larger ones, are forced to use such waters as may be practically available, and to make the best of them. But this best is by no means to be held lightly. By the methods to be described later it is possible to so change the nature and characteristics of polluted water as to convert it to the appearance, taste, and probable absolute wholesomeness of the most innocent of mountain torrents.

Water has the unfortunate capacity of readily dissolving many of the substances with which it may come in contact; so that outside of the laboratory, chemically pure water is practically unknown. Some of these foreign elements may not only be quite harmless, but may actually improve the quality of the water. It

is, however, with the others, which make the water containing them unsightly in appearance, disagreeable to taste or smell, or dangerous to health—in other words, with the substances which constitute pollution—that we are especially concerned.

If we divide all potable waters, according to their source, into *ground* waters and *surface* waters, the general statement may be made, that it is chiefly in the latter class that are found what may be properly termed polluted supplies. The former are for the most part subjected to such a rigorous process of natural purification as to place them beyond the need of any artificial treatment.

Surface waters, or the waters of lakes, ponds, rivers, streams, etc., are liable to receive more or less serious pollution from the following sources:

1. They may be colored by the drainage of swamps.

2. The waters of many streams become turbid with clay and other suspended matters after heavy rains.

3. The waters of lakes, ponds and storage reservoirs are liable, at certain seasons of the year, to contain large growths of algæ and other minute water plants which float about barely visible to the eye, but which are capable of imparting to the water disagreeable tastes and odors.

4. Any of these classes of surface waters may have discharged into them a greater or less quantity of human sewage; leading, under certain circumstances, to very grave consequences.

In determining the quality of a given water supply, the proper method of procedure is as follows:

1. To make a local examination of the water shed, in order that all probable sources of pollution may be discovered.

2. Then, if necessary, to have chemical analyses made of samples of the water, by which the nature of the contamination, and to a certain extent its amount and origin, may be ascertained.

3. To make a biological examination, giving the number and species of the living organisms that may be present. This will be of assistance in interpreting the chemical analysis; and also in detecting the possible presence of organisms, which in themselves might constitute an element of danger.

Before discussing the results of these analyses, it may be stated in advance that it is in connection with the *organic* matter in water, dissolved or suspended, visible or invisible, that serious pollution from a sanitary standpoint is to be apprehended. And it is in the information which they furnish on this point that the

chief value of the analyses consists. But in order to interpret them properly it will be necessary to allude briefly to the constitution of organic matter and to the changes it is liable to undergo.

To begin with, it includes all those combinations of the chemical elements whose formation depends upon the processes of life; and which, therefore, occur either in plants or animals. Its history is cyclical, consisting of a *constructive* phase or period of growth, and a *destructive* phase or period of decay; the death of the plant or animal forming the dividing line between the two phases. The cycle begins by the appropriation of inert, purely mineral substances from the earth by the green plants, which derive the necessary energy from the sunlight, and ends with the complete disintegration of the more or less complex structures which constituted its organic character, and the return of the elements to the earth.

With regard to the nature of the changes it may have undergone, it is only with those in the second or destructive phase that we are concerned. At the beginning of this phase, at the death of the plant or animal, we find that all organic matter is composed mainly of carbon, oxygen, hydrogen and nitrogen. The more nitrogen it contains, the more objectionable it is from a sanitary point of view. This destructive process is essentially one of oxidation. The first step is the oxidation of the carbon by the oxygen of the body itself, or by that from without forming carbonic acid gas, and leaving the nitrogen and hydrogen to unite to form ammonia. As decomposition proceeds, the ammonia is itself oxidized—the hydrogen to form water, and the nitrogen to form nitrous acid. The last step is the oxidation of the nitrous acid to nitric acid. The nitrous and nitric acids do not remain free, but combine with some base present, as soda or potash, to form nitrites and nitrates, the latter being purely mineral substances; so that the final results of the decomposition process are carbonic acid, water and nitrates. Thus the dead inorganic materials needed for the formation of organic structures are only borrowed; and ultimately are returned to the earth again as inert as when they were taken from it.

Returning now to the chemical analysis, we find the results given in some such form as the following, which is the one used by the Massachusetts State Board of Health:*

* The figures in this table indicate parts per 100,000.
There are also columns for the date of collection and examination, and for noting the color, turbidity, etc.

Sample.	Residue on Evaporation: Total	Residue on Evaporation: Loss on Ignition.	Ammonia: Free.	Ammonia: Albuminoid. Dissolved.	Ammonia: Albuminoid. Suspended.	Chlorine.	Nitrogen as: Nitrites.	Nitrogen as: Nitrates.	Hardness.	
A	3.85	1.00	.0002	.0048	.0012	.49	.0050	.0000	1.6	Average surface water.
B	40.25	——	.097	.0136	.0222	6.32	.3500	.0300	5.3	Private well.
C	10.50	2.40	.027	.0156	.0120	2.78	.1400	.013	3.6	Mystic Lake.

Now it has been found that a very accurate, and at the same time comparatively easy method of determining the organic matter in water by a chemical analysis is to determine the amount and condition of the nitrogen present. Thus, under the head of Albuminoid Ammonia, are entered amounts which are proportional to that part of the nitrogen which is derived from fresh organic matter, *i. e.*, from organic matter which has not yet begun to decompose. These columns, therefore, represent the possibilities of putrefaction still existing in the water. The amounts under Free Ammonia represent decay begun; under Nitrous Acids (or Nitrites) decay still further advanced; while under Nitrates the amounts entered represent the nitrogen derived from that portion of the original organic matter which has passed through all the stages of decay, and which has been converted into purely mineral matter again.

The importance of the determination of the chlorine is, that an excessive amount points to contamination by sewage which always contains a considerable proportion of common salt.

The actual amounts of the different substances as they occur in water supplies are exceedingly minute, as will be seen by referring to the above table of analysis, one of which samples (B) is a highly polluted one. Hence, in themselves these substances are of very little importance. It is in the history of the water which their presence indicates that their significance lies. Thus the chemical analysis can tell us not only what is in the water, but also a great deal about what is going on in it. It is only within recent years, however, that the methods of organic analysis have been capable of producing such results; when the first attempts at water purification were made, very little was known of the organic matter in solution, and the object aimed at was simply the

clarification of the water, or the removal of suspended matter visible to the eye.

This was the condition of things when James Simpson, in 1839, constructed a sand filtration plant for one of the London water companies. Each of the beds of this system consisted of a broad shallow basin or reservoir with water-tight bottom and sides. The depth was about 12 feet, and it was filled to about half this depth with the filtering material, which consisted of uniform layers of small stones, gravel and sand, the stones on the bottom and the finest sand on the top. Through the bottom layer of stones and gravel extended a number of branch drains leading into a larger central drain which was connected to the outlet (Fig. 2). The inlet to the filter bed opened above the surface of the sand, and both it and the outlet were provided with gates. The process of filtering consisted in flooding this bed of sand and gravel, and drawing off the water from beneath by means of the system of underdrains, which were built with open joints. The rate could be regulated by the gates or other apparatus on the inlet and outlet pipes.

As filtration progressed the surface of the sand became gradually choked up by the formation upon it of a layer composed of material removed from the water. When this layer became so impervious as to prevent the water passing in sufficient quantities, the filter was stopped, the water level drawn down below the surface of the bed, and the deposit layer removed, together with from one-half to one inch of sand. When the surface was smoothed and leveled, the bed was ready to be put in action again.

The frequency of the scrapings depended upon the condition of the water and the rate at which it was filtered; and when the sand layer had become reduced in thickness to what was considered a proper minimum, the whole amount removed was replaced at one time, either by new sand, or by the scrapings after they had been thoroughly washed.

The results from the use of these filters were so satisfactory, according to the ideas of purified water then in vogue, that in the following years several others were built in England, and a little later on the continent, especially in Germany. Some of the most important of the continental filters built during this period were designed by the English engineers Gill and Lindley. They were all built on the same general lines as the Simpson filter described above, the details varying somewhat with the individual notions of the designers.

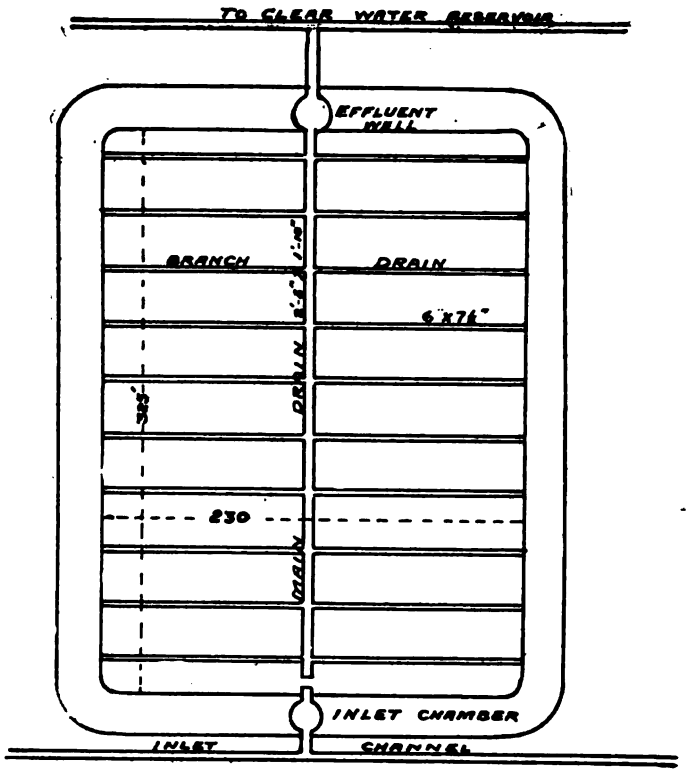

FIG. 2.
Plan of underdrains of Hamburg filters.

In America practically no attention was paid to the matter. In 1866 the late Jas. P. Kirkwood was employed by the city of St. Louis to report upon the condition of its water supply. His report included the result of his personal observations of the working of several European filters, and was translated and widely read on the continent of Europe. But his recommendations to St. Louis, so far as filter-beds were concerned, were not adopted. And between that time and 1892 only two plants were built in America, one at Poughkeepsie, N. Y., in 1872, the other in 1874 at Hudson, N. Y., both being after designs by Kirkwood.

A little earlier, in 1870, the English chemists Wanklyn and Frankland invented new and improved methods of organic analysis which led to more attention being paid to the organic matter in solution in water. A new importance was also attributed to it

at this time by reason of the ideas which were then held concerning the processes of fermentation and decomposition. It was supposed that decay could be communicated to sound organic matter by contact with other organic matter already in process of decomposition; this being the theory advanced by the chemist Liebig, who held that ordinary alcoholic fermentations were produced by the dead and decaying yeast cells, instead of by the action of the living and growing cells as we know now. And so it was considered that the presence of decomposing vegetable or animal matter in water would tend to set up injurious putrefactive changes in the digestive organs and thus produce disease. Hence when analyses of the effluents from the sand filters showed only a moderate reduction of the organic matter—seldom as much as 50 per cent.—the result was considered very disappointing, and as indicating that this method of filtration, while capable of improving the appearance and taste of the water, was of but slight hygienic value.

Not many years later, however, these ideas and theories were broken down by the researches of Pasteur, who demonstrated that the processes of fermentation and putrefaction were dependent upon the presence of living organisms; and that some of these organisms were capable of causing disease. A new view was now taken of organic matter in water, the presence of which was considered to be not necessarily dangerous in itself, except as indicating the probable presence of germs. Yet, while chemical purity was now deemed of much less importance than biological purity, the former remained the standard, owing to lack of satisfactory methods of prosecuting the study of these organisms.

Then, in 1881, came the famous discovery by Dr. Robert Koch of his "plate culture" method. Hitherto, owing to the extreme minuteness of the bacteria, and the enormous rate at which they increased in number under circumstances favorable to their growth, it was almost impossible, with the methods then available, to make much progress in the knowledge of the subject. But with the advent of Koch's invention these difficulties were to a great extent removed. It now became possible to determine the number of germs, to study their habits of life, functions, etc., and to classify them into species, in a manner which, considering the kind of creature dealt with, seems quite marvelous.

Besides placing the germ theory of disease on a firm basis, this discovery of Koch's marks the beginning of the period during which it has been possible to deal with the subjects of the purifica-

tion of water and sewage in a rational and scientific way. Numerous investigators at once began the study of these questions under the new and vastly improved circumstances. Inasmuch as the results of many of their experiments have a direct bearing upon the subject under consideration, a brief description of the nature and some of the characteristics of the bacteria will be given before proceeding further.

BACTERIA.

They belong to the lowest and smallest forms of life. Structurally they are composed of a single cell with a wall, possibly of cellulose, and contents consisting of apparently structureless protoplasm and a nucleus; and are thus comparable to the bone, blood, nerve cells, etc., which represent the ultimate structural composition of the animal body.

They are of such extreme minuteness as to be visible only to high powers of the microscope. In their greatest dimensions they vary from one-tenth to two micro-millimetres (from one-two-hundred-and-fifty-thousandth to one-twelve-thousandth of an inch). A sphere one-twenty-fifth of an inch in diameter could contain more than five hundred millions of the larger ones, and it would take a thousand of them placed in a row to reach across the diameter; so that it is little wonder that their presence was, until a few years ago, scarcely suspected. They are generally transparent, but may be stained for purposes of study by some of the aniline dyes.

It was at first doubtful whether they should be classified as plants or animals; but it is now definitely decided that they are plants. Some of them have the power of motion, which appears to be by means of little hair-like appendages or cilia. They reproduce by fission—a simple process by which a single bacterium divides itself in the middle, thus producing two. Under favorable conditions this multiplication can go on with incredible rapidity. They comprise a great number of species with definite characteristics and requirements for growth, etc. All these species are included in the general term *bacterium*, or *microbe*, or *germ*.

They may be classified in various ways, depending upon their form, the nature of their environment, the products of their action, etc.

According to its form a germ may belong to:

1. The *micrococci*, or ball shaped.

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2. The *bacilli,* or rod shaped.

3. The *spirilla,* or spiral shaped.

They occur usually as separate individuals, but may also occur in pairs, tetrads, or in a row like a chain. Besides these forms they are often found under certain circumstances in irregular groups or masses, held together by a transparent glutinous material which they secrete through their cell walls. These sticky, jelly-like masses are termed zöoglœa. Unlike the algæ and other green plants, they cannot exist upon purely inorganic matter, but require for their nourishment matter already organized in some form. Moisture is also a necessity to their proper growth; and thus according to their habitat or preferred environment they are classified as:

1. *Saprophytes,* living on dead animal or vegetable matter, or on water containing these in solution.

2. *Parasites,* subsisting on a living host, in the body of which they grow and multiply, in some cases without any injurious effect, but in others causing disease and death. It is not known whether these results are produced by their action in obtaining their food or by the products which are thus set free. These injurious members of the parasitic class are the so-called pathogenic or disease-producing bacteria; such as the well-known germs of typhoid and cholera. Some species of bacteria are able to exist either as saprophytes or parasites, and are called *facutative.*

Another classification depends upon their ability to live in the presence or absence of oxygen, *e. g.:*

1. *Aerobic,* requiring the presence of oxygen.

2. *Anäerobic,* unable to exist in the presence of this gas.

Facutative anäerobics can live either with or without oxygen.

There are various other ways of classifying them which are of no special interest in this connection. The most important classification, from our point of view, is that which divides them into parasites and saprophytes. The great majority of bacteria belong to the latter class, and depend for their nourishment entirely upon lifeless animal or vegetable material. Their energies are thus devoted to the task of attacking dead and decaying organic matter, tearing it apart (in the chemical sense), breaking up its complex combinations, and ultimately reducing it to unobjectionable inorganic compounds. This is accomplished in many different ways, depending upon the attendant circumstances and the species of the dominating germ. But the final result is the same. All these destructive processes in the history of organic

matter, which have been previously referred to, were formerly considered to be purely chemical; but it is now known that if the bacteria are absent or in any way rendered inactive, no decomposition of any kind can take place even in air. Hence it is evident that the rôle they play in nature, is, for the most part, a beneficent one. They are the universal scavengers, and but for them all organic growth would in time be overwhelmed by its own waste.

There are, however, also the pathogenic members of the parasitic class, which, though few in number when compared with the others, are yet possessed of the same capacity for multiplication when the conditions are favorable. But while the absence of such conditions will arrest their growth and development, it does not necessarily cause their death. For instance, the temperature most suitable to the typhoid germ is that of the human body, which is its natural habitat; yet it can exist for months in the middle of a block of ice, and then continue its normal career with undiminished energy and virulence. Hence, of the different kinds of water pollution, human sewage is the most to be feared, since it is at any time liable to contain such germs; and the method which can best insure their removal is evidently the one best suited for domestic purification.

With the adoption of bacterial purity as a standard for water purification, it is no wonder that it was anticipated that the sand filter would prove even of less hygienic value than it did from the chemical point of view. Thus in a paper read before the Institute of Civil Engineers about this time the following statement occurs: "Filtration is another remedy put forward as infallible by those who have not grasped the subject. How can filtration affect substances dissolved in water? And as for the minute organisms found in putrescent bodies, they could pass a hundred or a thousand abreast through the interstitial spaces of ordinary sand as used for this purpose." Nevertheless, as experiments and tests multiplied, it soon became evident that these same clumsy contrivances were actually removing from 97 to 98 per cent. of all the germs contained in the water. Not only this, but continued study and experiment since then have resulted in such changes in the methods of building and operating these filters that they can now be depended upon to remove from 99 to 100 per cent. of the bacteria, and although numerous other devices for filtering have been invented and tried, so far none have been shown to be equal in efficiency to the sand filter. Thus did these earlier engineers

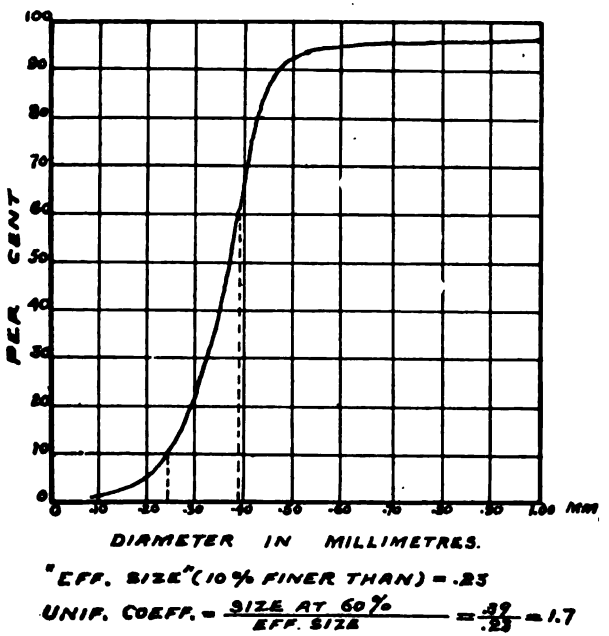
build better than they knew, and produce results whose excellence they did not even suspect.

Investigation into the manner in which it was possible for a comparatively porous material like the sand bed to hold back such infinitesimal bodies as the bacteria revealed a paradoxical condition of affairs, viz., that these germs, while constituting the most dangerous element in the pollution of drinking water, were at the same time the chief agents in its purification. It was found that the purifying action was partly mechanical and partly biological, the circumstances attending the latter not being very well understood. The manner in which it takes place and the means by which it may be enhanced will be referred to while describing the construction and operation of a modern filtration plant.

In describing the materials of the bed and the best method of disposing them, we shall begin with the sand.

SAND.

It is in the sand layer that the actual purification takes place; and it is observed that the efficiency and economy of the process



Graphical representation of a mechanical analysis of a sample of sand.

are dependent to a considerable extent upon the size of the sand grains and the thickness of the bed. It is the smaller grains which determine the "effective size" of a sample of sand; by filling up the spaces between the larger ones they fix the diameter and length of the channels through which the water must pass.

At Lawrence, as the result of experimenting on the rate at which water flows through various sizes of sand, the "effective size" is taken as that of the grain which has 10 per cent. by weight of the sample smaller than itself, and 90 per cent. larger. This size is obtained by a process of mechanical analysis described in the Report for 1892, which also gives what is termed the "uniformity coefficient," the latter being the ratio of the size of the grain which has 60 per cent. smaller than itself to the "effective size." (See Fig.) If we look more closely into the purifying action of the sand, in order to be able to understand just how it is affected by difference in the "effective size," "uniformity coefficient," thickness of the bed, etc., we shall see that what takes place is as follows:

When water is first let in to the filter, it rises to a depth of 3 or 4 feet above the surface of the bed; and it is either held there for some hours, or filtration is allowed to proceed at once, the first part of the effluent being wasted. In either case, the sand grains at the surface soon become enveloped in a membranous film composed partly of the zöoglœa form of the bacteria, and partly of the more or less finely divided organic matter which the water holds in suspension. This sticky, jelly-like substance, extending around and between the sand grains, entangles and holds back the smallest particles in the water, even the bacteria themselves. The latter are not only prevented from moving further, but are detained under such adverse circumstances as to not only arrest their growth and multiplication, but also to cause their death.

Naturally the larger suspended particles, water-animalculæ, fragments of plants, etc., are stopped at the very surface of the sand, and a continuous mantle called by the Germans the *Schmutzdecke* is soon formed and covers the whole bed. Under certain circumstances, as for example when the water contains a large algæ growth, this layer forms a dark greenish carpet of a texture like felt, which when dry can be peeled off in flakes. Ordinarily, however, since it contains a certain quantity of silty matter, it penetrates the sand for a depth of half an inch or so. But even when formed in this way there is often almost a distinct plane of

cleavage between it and the sand below, which makes it very easy to remove with broad square-cornered shovels. This operation becomes necessary when the gradual thickening of the surface layer prevents the required quantity of water from passing.

It will thus be seen that the surface film forms of itself an exceedingly effective filtering material, but with a very delicate structure; and as such, should be carefully guarded against any influence which might cause its fracture. Several European engineers have concluded that it alone constitutes the actual filtering medium; and that the remainder of the sand bed serves merely for its support, and for steadying the flow of the water through the bed. But experiments made at the Lawrence Station do not by any means verify this view. Indeed they have shown that if great care is taken not to disturb the underlying sand, almost the whole of the surface layer may be removed without at all affecting the bacterial character of the effluent. It is also shown that a new filter does not arrive at what is called its "full bacterial efficiency" until it has been in use for a considerable time; even though in the meantime surface layers may have been formed of sufficient thickness as to completely clog the filters.

By examining the sand, it has been found that this sub-surface purification only occurs when the sand grains for a considerable depth below the surface have become coated with a film of the gelatinous organic material referred to above. It has also been shown that if, during scraping, the bed is subjected to any considerable mechanical disturbances, as by spading, by which these envelopes are broken and detached, the result is a decided inferiority in the quality of the effluent. It is a well-known fact, that the longer the sand is in use the greater is its efficiency for filtering purposes.

All these considerations go to show that while undoubtedly most of the purification takes place in the surface layer, it is not absolutely essential. The facts stated are chiefly of importance in so far as they indicate the true principles upon which the process of filtration depends. They should by no means tend to lessen the care which ought always to be exercised to preserve the surface layer intact. The purifying power of the main body of the sand should be considered as a factor of safety, and as an additional guarantee of good results.

As to the influence of the size of the sand, it may be stated generally that the "uniformity coefficient" should be as low as pos-

sible. Also that the smaller the "effective size" the more efficient is the filtration, the less liability is there to disturbing effects, and the sooner does the sand arrive at its full bacterial efficiency. At the same time it must be operated at a lower rate, becomes clogged more easily, and thus requires more frequent scraping. The latter performance, together with the periodic renewal of the sand, will form the principal part of the expense of operation. There is thus a minimum limit beyond which it would be uneconomical as well as unnecessary to go. The best size, taking everything into consideration, will evidently depend to a considerable extent on the quality of the water and other local circumstances.

The "effective size" of the sand used in the principal European filters varies, according to Mr. Allen Hazen, from .20 to .44 millimetres; and the "uniformity coefficient" from 1.5 to about 3.7.

As to the proper depth of the sand layer, there is even now considerable difference of opinion among engineers. The great variations in the depths of the sand in the older filters, shown by Fig. 1, are not surprising, considering the fact that when the most of them were built nothing was known of their biological action. If we adopt the view, that it is only the surface film which filters, the determination of the best thickness becomes merely a matter of comparing the extra operating expense due to the more frequent renewals of a thin bed, with the corresponding saving in first cost. In most of the European filters the renewal does not take place till the thickness of the bed has been reduced to from 12 to 24 inches. The former is the limit imposed by the Imperial Board of Health of Germany. It would seem to be better practice to require a minimum depth of from 2 to 3 feet, in order to have at all times the benefit of the steadying effect produced by depth of bed. Besides this there is the additional advantage of having a deep permanent layer, which is never disturbed, and which, therefore, causes the filter to increase instead of decrease in efficiency as it grows older.

GRAVEL.

The layer of gravel serves to support the sand and to conduct the water horizontally to the underdrains. The excessive thickness used in some of the old filter beds (see Fig. 1) is not at all necessary, 12 or 15 inches being quite sufficient. It should con-

sist of three or four layers of graduated sizes, the top one being fine enough to support the sand without any liability of the layers getting mixed. Around the openings into the underdrains the

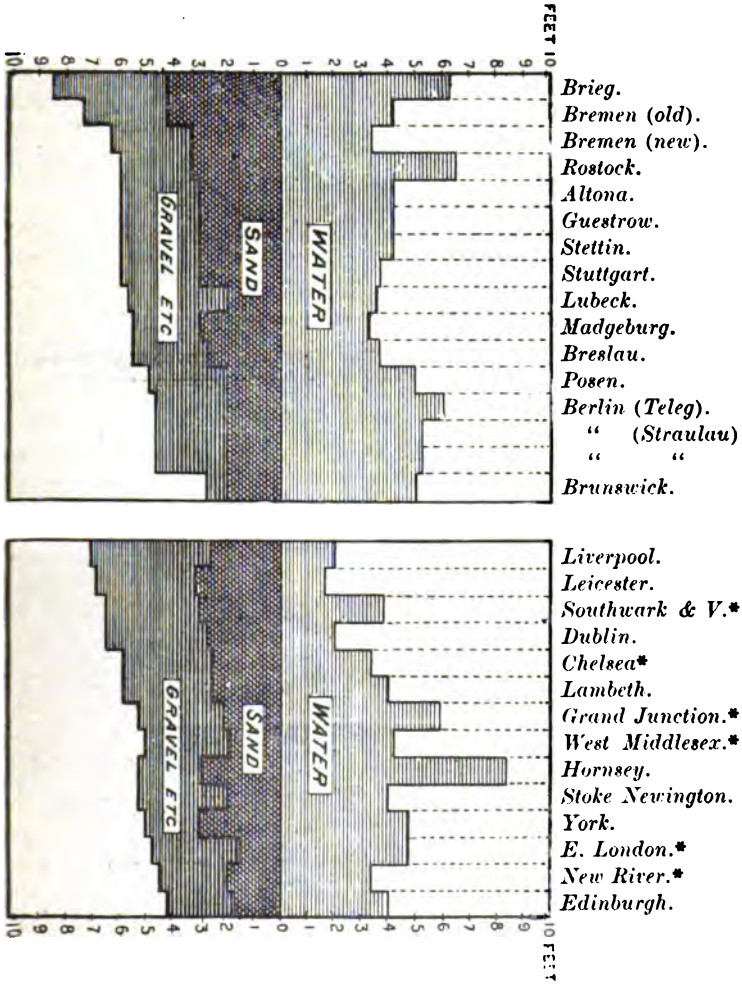


FIG. 1.—Diagram showing Depth of Materials in several European Filter Beds.]

separate stones should be carefully placed so as to avoid any possibility of movement when the water begins to flow. If necessary the gravel must be thoroughly washed before being put in place.

* London Water Companies.

In arranging the underdrainage system of a filter, which includes the gravel bed, the object to be aimed at is to cause the water to sink vertically through the sand, and as nearly as possible at a uniform rate in all parts of the bed. In order to effect this it is evident that the resistance to horizontal motions in the

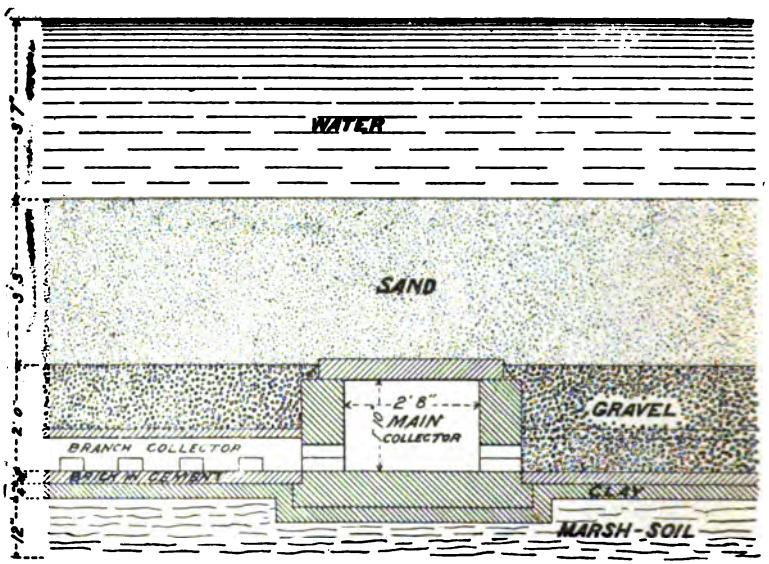


FIG. 3.—Section of Hamburg filter bed.

underdraining system must be everywhere nearly the same. Attempts have been made to calculate the proper size of the underdrains, using formulæ for the flow of water through gravel and sand of various sizes. A discussion of the matter will be found in the Report of the Massachusetts State Board of Health for 1892, and also in Allen Hazen's book on the "Filtration of Public Water Supplies," p. 32-41. With round tile drains, and a daily filtration rate of 2.57 million gallons per acre, Mr. Hazen suggests the following limits to the area which pipes of the different sizes should be allowed to drain:

Diam. of drain.	To drain an area not exceeding	Corresponding velocity of water in drain.
4 inches.	290 square feet.	0.30 ft. per sec.
6 "	750 "	0.35 "
8 "	1530 "	0.40 "
10 "	2780 "	0.46 "
12 "	4400 "	0.51 "

and a cross-sectional area for the larger and main drains of at least one-six-thousandth of the area drained. With the rate mentioned this would give a maximum velocity in the drain of 0.55 feet per second.

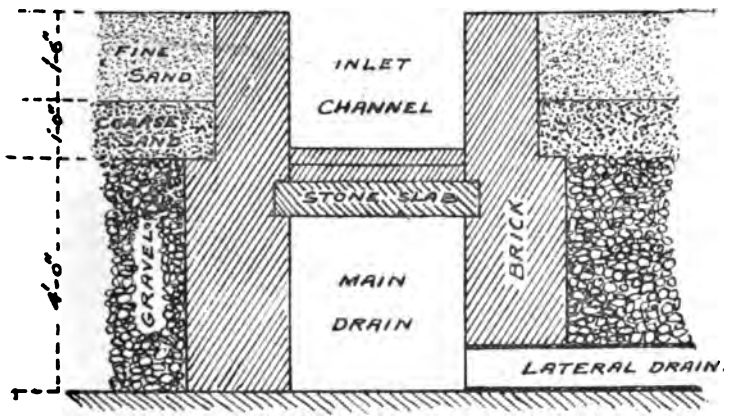


FIG. 4.—Section of filter bed proposed in 1866 by Kirkwood for St. Louis, Mo.

These underdrains are variously constructed of open jointed channels of stone or brickwork, or of tile pipes with perforations or open joints. (See Figs. 3, 4, 5, 6.) There is no advantage in spacing the laterals more than about 16 feet apart, as the extra quantity of coarse gravel necessary would cost more than the saving in the pipe. In some filters the underdraining has been accomplished by means of a double bottom of open brickwork supported on arches or other arrangements of the same material.

The lateral drains usually rest upon the bottom of the basin, but the main drain is often placed lower. (See Figs. 5 and 6.) If the top of the drain is higher than the coarsest layer of gravel,

that part should be closed to prevent the entrance of the fine gravel.

In several of the old filters vertical ventilating pipes extend from the underdrains above the surface of the water on the bed. These are for the purpose of allowing the escape of air from below, so as not to cause disturbance by passing through the sand. They are not used in the latest filters, as it was found that they

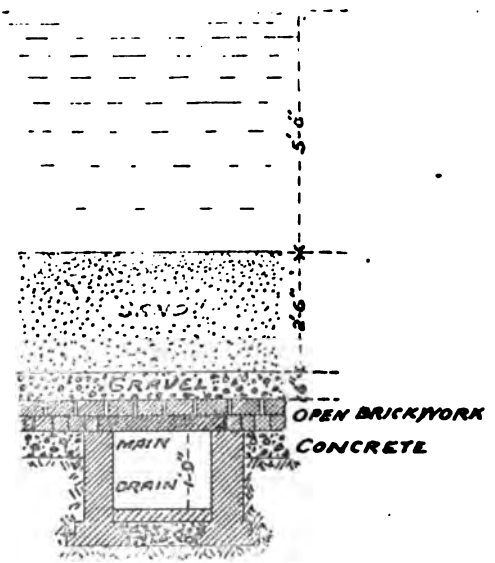


FIG. 5.—Section of filter bed, New River Water Company (London).

were of no advantage, but rather a source of trouble, through the formation of channels between them and the sand, which allowed water to pass without filtration.

BASIN.

The basin which incloses the filtering materials must of course be water-tight; and in that respect the same care must be exercised in its design and construction as would be necessary in the case of any reservoir for holding water. Its depth will depend upon the thickness of the bed and the height to which the water is to be allowed to rise, but does not usually exceed 10 or 12 feet. The bottom is usually level, or perhaps with slight depressions for the lateral drains. The walls may be either vertical or sloping.

FIG. 8.—COVERED FILTER BED AT ASHLAND, WIS.

depending upon the material used. Taking into account the necessity of uniformity in the filtration rate at different points of the bed, vertical sides are probably preferable to sloping. Local circumstances will as a rule determine the best method of construction and the material to be used. The latter may include stone masonry, brick, concrete, earth embankments, puddle, etc. Con-

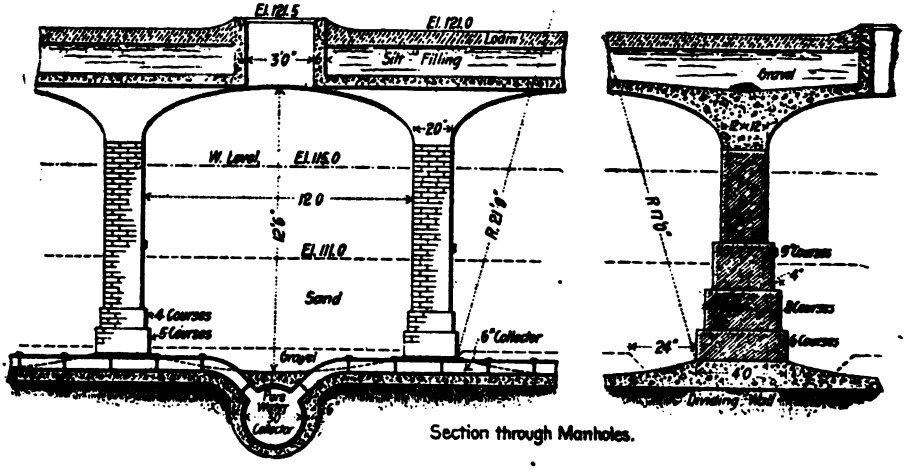


FIG. 6.—Section of filter bed for Albany, N. Y. (from Engineering News).

crete is a very satisfactory and in most cases an economical material to use for any part of the structure.

If a roof is required it should consist of groined arches, supported on pillars, preferably of brick. (See Figs. 8, 9 and 10.) Care is necessary to obtain a solid foundation for the latter, as the form of roof will not admit of much unequal settlement. A good plan is to form the bottom of flat inverted arches, which will give a firm and even support for all the pillars; and the lateral underdrains will then lie along the hollows midway between the rows of piers. (See Figs. 6 and 7.) With a roof of this kind vertical side walls will be more economical than sloping ones. But the plane surface between the wall and the bed must be broken by projections, in order to prevent the liability of unfiltered water passing along the junction; which remark also applies to the piers. It is to prevent this same contingency that the gravel layer is only carried to within 2 or 3 feet of the walls, its place being filled by the sand which here composes the whole depth of the bed. (See

Figs 6 and 7.) Around the inlet and outlet chambers there should be no gravel within five or six feet of the walls.

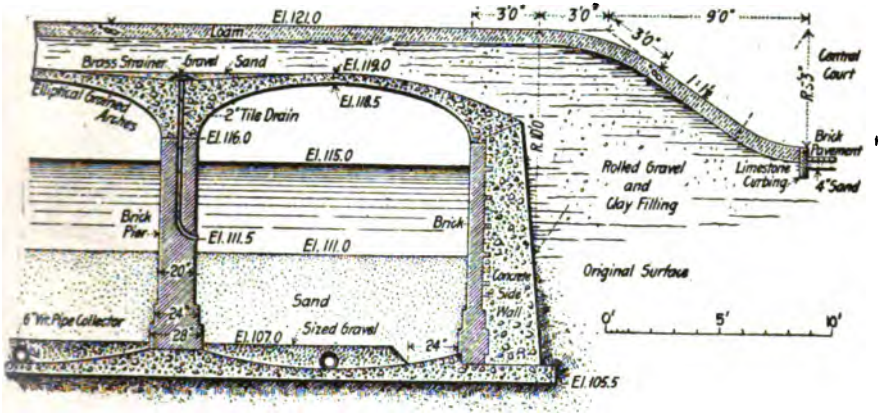


FIG. 7.—Section of filter bed for Albany, N. Y. (from Engineering News).

Manholes must be constructed in the roof for the admission of light and air. Also a "run" for entering and removing the sand scrapings, etc. With piers spaced 14 or 16 feet on centres a light and strong roof can be built of concrete at a very moderate cost. When the roof is finished it is covered to a depth of two or three feet with earth surmounted by a layer of loam, which may be seeded down or laid out in flower beds, etc.

For open filters the sides may be of earth embankments, made water-tight by a layer of puddle or concrete. If of the former, a paving of brick is necessary, which must be of sufficient strength to withstand the action of the ice where it is exposed.

OPERATION.

Before proceeding with the methods of operating a filtration plant, reference will be made to Fig. 11, which shows diagrammatically a filter bed with inlet, outlet, underdrains, etc. With a given flow of water through the bed, the vertical distance H represents the head required to force this quantity through the surface film, the sand, gravel and underdrains. It is variously termed "loss of head," "head on the filter," "filtering head."

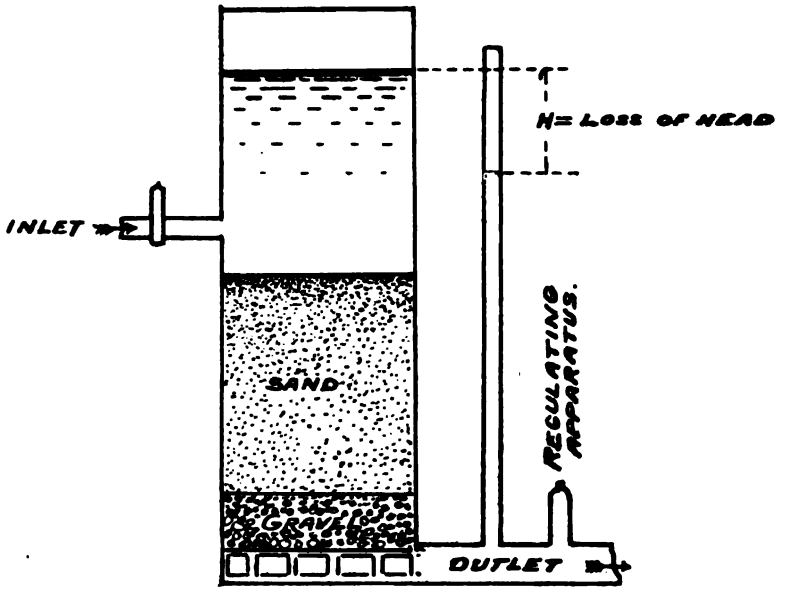


FIG. 11.—Diagram showing various parts of a filter bed.

The depth of water in the majority of European filter beds is usually from 3 to 4 feet, with the full depth of sand. In some of these filters, it was allowed to rise and fall according to fluctuations in the removal of the effluent. Such variations in depth, however, are found to have an injurious effect upon the surface layer, and on the efficiency of the filtering process; in the newer plants, therefore, they are provided against by an apparatus on the mouth of the inlet pipe by which the water when it reaches a certain height automatically closes the inlet. These consist usually of some form of balanced valve worked by a float. In connection with an open filter such an arrangement must be of course protected from frost.

The inlet opens into a small chamber at the side of the bed from which it is separated by a wall. The water flows over the wall on to the bed, and is prevented from disturbing the surface of the sand by paving it for a short distance from the chamber. Sometimes the water enters by overflowing an open masonry channel extending across the surface of the bed. (See Fig. 4.)

The loss of head, corresponding to a given rate of flow of water through the filter, will depend upon the extent to which the surface film has formed, and the friction in the sand, gravel and underdrains; but under any given conditions it varies (within practical limits) directly as the rate.

In some of the old filters the outlet was connected directly to a clear-water basin, or pump well; and the difference in level between the surface of the water in the filter and of that in the well was, of course, equal to the loss of head. Fluctuations in the draft upon the well produced corresponding fluctuations in the filtering head, and therefore in the rate which was thus automatically adjusted to the demand. In others, however, some sort of apparatus was placed between the filter and the clear-water basin by which the rate could be kept constant. This is now considered to be of the greatest importance for the reason that bacterial tests of the effluents have shown that marked deterioration invariably follows fluctuation in the rates. This is probably caused by the mechanical disturbances produced in the sand bed and surface film. For details of such tests, see Report Massachusetts State Board of Health for 1894.

In the newest plants, therefore, some kind of an arrangement is always provided for the regulation of the flow, examples of which are shown in Figs. 12, 13 and 14. Since the rate varies directly as the loss of head, it is immaterial which is regulated. Some of these devices, therefore, regulate the flow directly, while others accomplish the same result by the indirect method of regulating the loss of head. In order that the former may be kept the same from one day to another, the latter must be gradually increased as the period of service of the bed extends, so as to correspond with the increasing resistance of the surface layer. This is effected automatically in the device shown in Fig. 12, which was designed by Lindley for the filters at Warsaw. The apparatus is contained in a water-tight chamber, connected on one side with the filter and on the other with the clear-water basin. The rate at which the water can pass from one to the other depends upon the depth to which the slits in the sliding pipe extend beneath the surface of the water. This is adjusted by weights at the other end of the chain which passes over a pulley. Thus the rate can be kept constant; and as the resistance of the bed increases the level of the water in the chamber will automatically adjust itself to produce the necessary differences in level or loss of head.

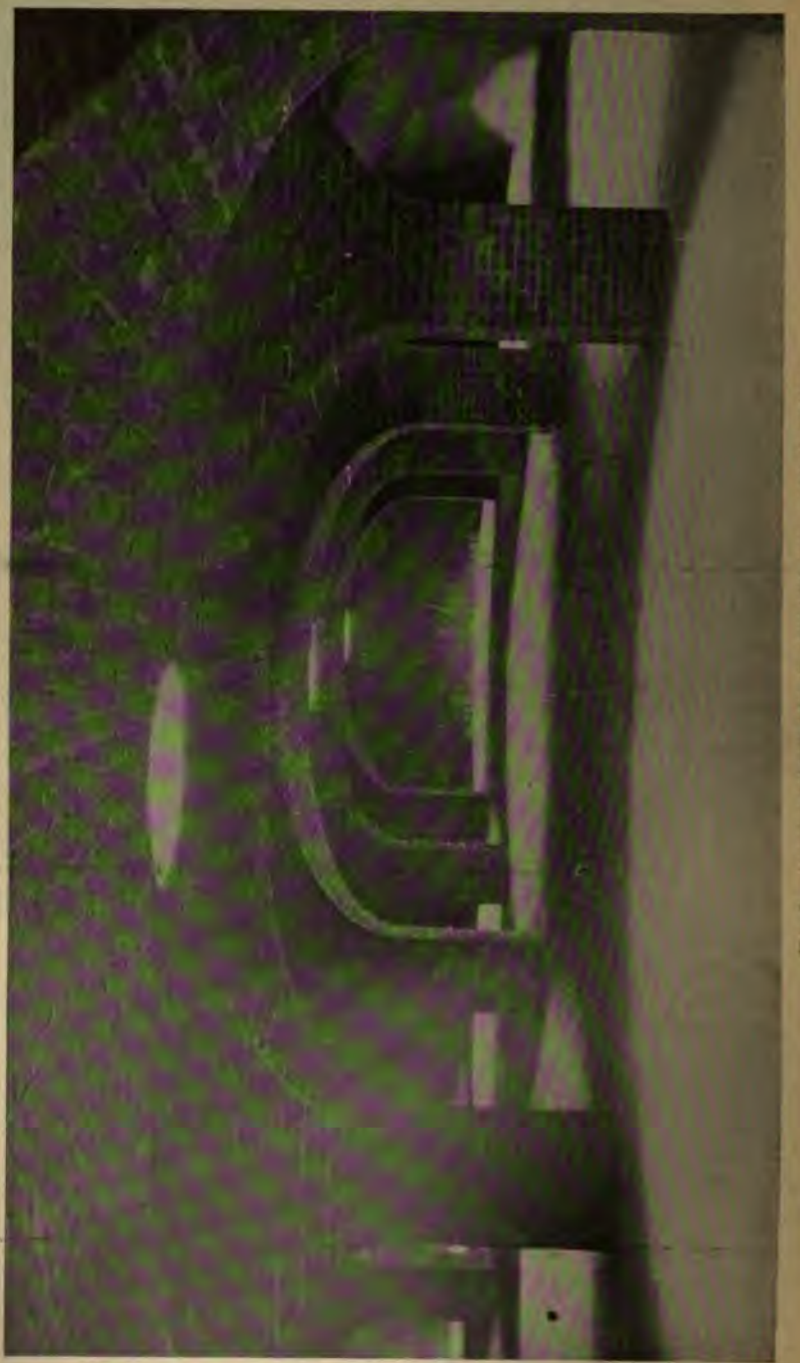


FIG. 8.—COVERED FILTER BED AT ASHLAND, WIS., SAND IN PLACE.

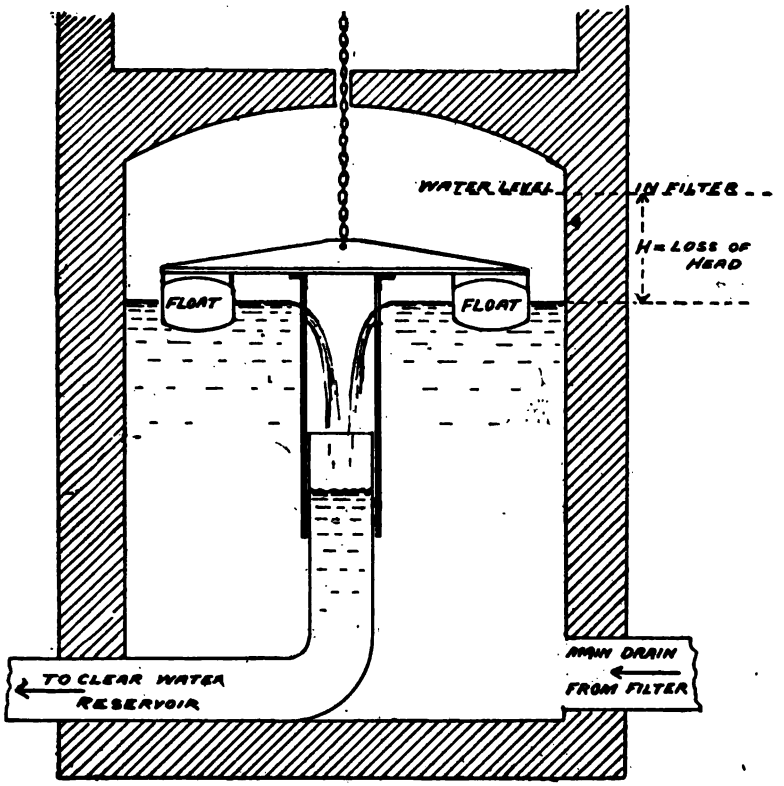


FIG. 12.—Regulator designed by Lindley for the Warsaw filters.

Fig. 13 shows the method of regulation devised by Gill for the Tegel Works of the Berlin water supply. The outlet from the middle chamber is through a weir; and the depth of water on its crest, and therefore the discharge, is indicated by the height of the float read on the scale *a*. This is kept constant by means of the gate. The corresponding loss of head is shown by the difference of the readings on scale *b*. Keeping the water in the filter always at the same level, a constant rate can only be maintained by the gradual falling of the level in the right-hand chamber and a consequent wider opening of the gate.

Fig. 14 shows the principle used in the new Hamburg filters. A similar method was recommended by Kirkwood for St. Louis.

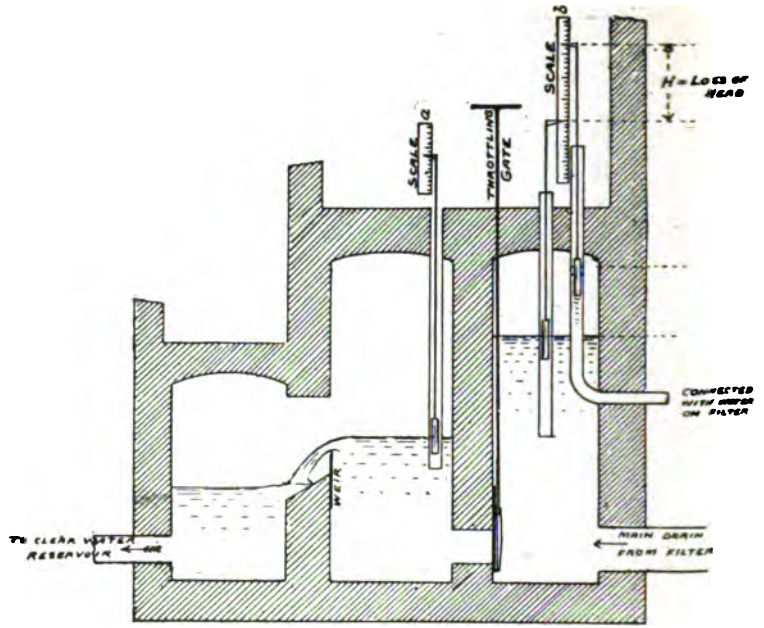


FIG. 13.—Regulator used in the Berlin (Tegel) works.

The scale on the right reads downwards, and its zero corresponds to the level of the surface of the water on the filter, which must of course be kept constant. In the first chamber is a float with a pointer attached. The reading of this pointer on the right scale evidently gives the loss of head. The reading of the same pointer on the other scale gives the corresponding rate. This is accomplished in the following way: The outlet of the first chamber is through the weir, which is movable in a vertical direction. The smaller scale is fixed to this weir as shown in Fig. 14, so that the distance between the crest of the weir and the zero of the scale is the same as that between the pointer and the water line of the float. Both loss of head and the rate may therefore be regulated by lowering or raising the weir.

As to the limit beyond which the loss of head should not be allowed to go, the general opinion seems to be that it should not be greater than the depth of water on the bed, though the Lawrence experiments have not shown any bad effects from exceeding this limit.

As a general thing it may be stated that, everything else being equal, the higher the rate the poorer the quality of the filtrate.

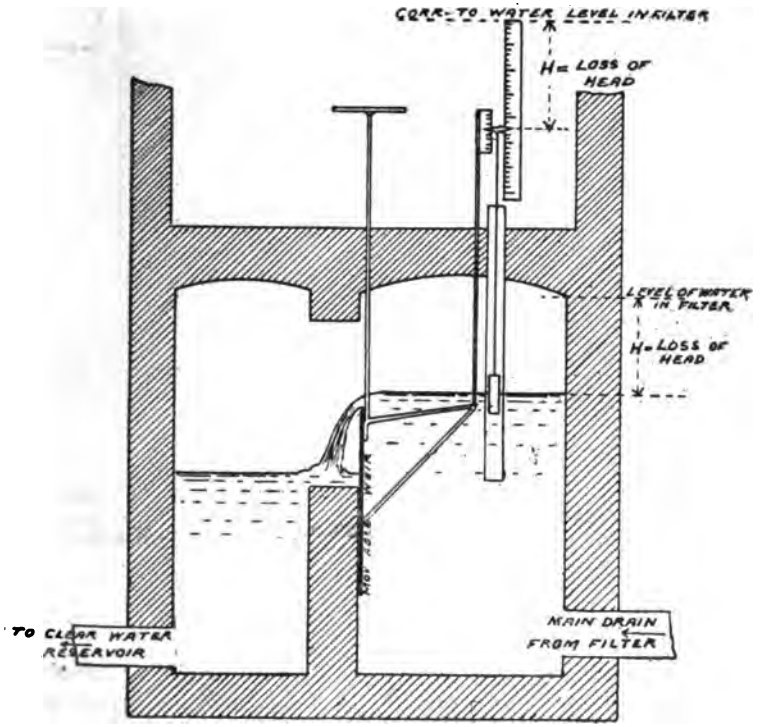

CORR. TO WATER LEVEL IN FILTER
H = LOSS OF HEAD
LEVEL OF WATER IN FILTER
H = LOSS OF HEAD
TO CLEAR WATER RESERVOIR
MAIN DRAIN FROM FILTER

FIG. 14.—Regulating apparatus used in the new Hamburg filters.

But with fairly low rates this deterioration is slight, so that entirely satisfactory results can be obtained with rates up to three or three and a half million gallons per acre per day. Probably higher rates could be safely employed if very great care were exercised in the operation of the filter. The relative effects of high and low rates from a financial point of view are discussed further on.

SCRAPING THE FILTER.

When the clogging of the filter bed has become such as to require a loss of head greater than the prescribed limit, the inlet is closed and the water allowed to drain away until it has sunk some distance below the surface of the sand. When this has become sufficiently firm, workmen enter the bed with planks, wheelbarrows and broad flat shovels. With these they carefully remove

the surface layer and pile it up in little heaps, which they afterward remove with barrows. The depth removed varies from one-half to one inch, and averages about eight-tenths of an inch. The surface of the sand is then raked to loosen up the packing caused by the boots of the workmen, and after smoothing down any irregularities the planks are removed and the filter is ready for another period of service.

The refilling begins from below by admitting through the underdrains filtered water from another bed in action. The object of this is to drive out the air from the pores of the sand, where its presence in the form of bubbles would cause considerable unnecessary friction. When the water has risen a few inches above the surface of the sand the lower connection is shut off and the refilling is completed by means of the surface inlet.

Before filtration proper begins the water should be allowed to stand on the bed for several hours, or the first million gallons or so should be wasted. The amount wasted can be reduced by beginning the filtration at a low rate and gradually increasing it to the maximum.

When the scrapings have reduced the sand bed to the minimum allowable thickness the total amount removed, which has in the meantime been thoroughly washed, is replaced at one time. Before doing so the surface of the permanent layer, which is never removed, should be loosened up by being spaded over to a depth of six inches or so. If this is not done there is a liability of subsurface clogging at its junction with the clean sand.

When the filter is started again it is, except for the permanent layer, in the condition of a new filter, and so requires extra care in operating it, and the filtrate should be wasted for a much longer time than is required after the scrapings. Piefké, of the Berlin water works, places this period at six days.

Considering the labor necessary and the time the bed is out of use, this replacing of the sand is an expensive operation, and should not occur oftener than can be avoided. In most plants the usual period is about once a year.

SAND WASHING.

Sometimes it is possible to obtain new clean sand at less cost than is necessary to wash the old. But this is rarely the case; hence an important part of the equipment of a fair-sized filtration plant is the apparatus for the washing of the sand. The simplest

of the methods employed for this purpose consists of a broad, shallow box, which is set in an inclined position. The dirty sand is thrown into this box and a jet of water played upon it from a hose. The water overflows from the lower end of the box and carries the dirt with it. This is continued until the water runs off clean.

The more elaborate methods employ mechanical means to force the water through the sand. Drum-washers, operated by horse or steam power, are largely used in Germany. They are set in an inclined position, and the sand, with streams of water playing upon it, is forced from the lower to the upper end by means of revolving spiral blades. Various other methods more or less on the same principle are employed. Fig. 15 shows the sand-washer used at

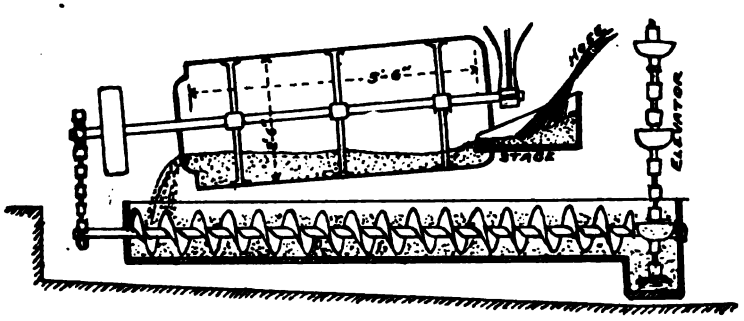


FIG. 15.—Sand-washing apparatus used at Hudson, N. Y.

Hudson, N. Y. The dimensions are shown on the figure. The dirty sand is shoveled onto the stage, from which it is washed by a hose jet into the revolving cylinder. From the lower end of the latter it falls into a wooden trough one foot square in section and closed at both ends. The screw forces the sand into a pit at one end, from which it is elevated by buckets to the floor of the sand storehouse above. The water overflowing the box carries the dirt with it.

The "Ejector" washer is probably the most efficient of all the methods employed. It consists of a series of conical hoppers arranged in a row. At the bottom of each hopper is an ejector through which a stream of water passes under a pressure of fifteen or twenty pounds. The dirty sand is thrown into the first and largest hopper. From this it is ejected through a vertical pipe into a trough, from which it falls into the next hopper. Here the same thing occurs, and the process is repeated until the water,

which is continually overflowing from the hoppers, comes off clear. The whole arrangement must be inclosed in a masonry pit, from which the dirty water is conducted by drains. Six or eight hoppers are required for each machine, which will have a capacity of from five to six cubic yards per hour. Sand-washers of this type are used in the new filters at Hamburg (Fig. 16), and are to be used in the plant now under construction at Albany, N. Y. Details of the latter are given in "Engineering News," February 10, 1898.

The volume of water required in sand-washing varies, according to the method used, from twelve to twenty times that of the sand, the ejector machines apparently requiring the most. The question of cost will be referred to under maintenance.

INTERMITTENT FILTRATION.

The operations which have been described in the foregoing pages are those connected with the carrying on of what is known as *continuous* sand filtration; and in determining what methods produce the best result, our only test has been the degree of bacterial purification effected. The reason of this is, as we have already seen, that in waters at all likely to be used as public supplies, the actual amount of organic matter is relatively so small as to be of little sanitary significance. Nevertheless, there is a certain degree of chemical purification effected by this process. Analyses of the effluents show a reduction of the dissolved organic matter of from 30 to 60 per cent. This is brought about by the action of the bacteria, which, though existing under adverse conditions, are yet capable of producing this result in the presence of the free oxygen in the water, the amount of which is usually quite sufficient for the purpose. Now, in the case of sewage, which is only very highly polluted water, the amount of free oxygen is very small in comparison with the organic matter present. And it was found, in making experiments on the purification of sewage by passing it through beds of sand, that if air were artificially introduced a very complete reduction of the organic matter would be effected by the bacteria. This was accomplished by working the bed intermittently; that is to say, at regular intervals of time—say twenty-four hours—the bed was allowed to drain, and fill its pores with the air drawn in after the sewage. After taking this breath the bed rested for a day; then the sewage was again turned on to the surface, preventing the escape of the air which was necessary

to provide oxygen for the next twenty-four hours' purification. The same method used in connection with water is what is termed *intermittent filtration.* The first filter of the kind was built at Lawrence, Mass., by H. F. Mills, C. E., member of the State Board of Health. Since then small plants on the same principle have been built at Mt. Vernon, N. Y., and Grand Falls, North Dakota.

The results do not seem to indicate any necessity for their use, not being at all superior to those of continuous filters, while the method of operation is not suited to cold climates, and either requires a greater area of bed or a higher rate of filtration. A description of the Lawrence filter may be found in "Trans. Am. Soc. C. E.," 1893, p. 350.

GENERAL ARRANGEMENT.

From what has been said, it will be evident that where the water is at any time liable to turbidity, a settling basin, capable of holding from twelve to fourteen hours' supply at least, must be provided. Also, in order that the filter may be able to work continuously at a uniform rate, a clear-water basin will be necessary of a capacity sufficient to cover the maximum fluctuations in the con-

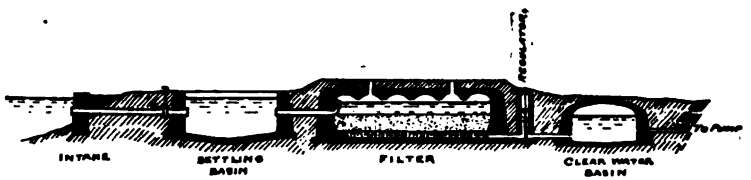


FIG. 17.—Sketch showing the relation of the parts of a filtration system.

sumption. Fig. 17 indicates roughly the general arrangement of the parts of a complete system. If the supply is from a storage reservoir, the filters are placed below the dam, and are, of course, supplied by gravity. (See Fig. 18). But even when the supply is from a river or lake, the topography of the ground often admits of the same economical arrangement. If this is not possible, the water must be pumped into the settling basin by a separate pump of the low lift variety. The extra expense of two pumpings may be almost eliminated if the same station, boiler plant, etc., can be made to serve for both pumps.

The total area of filter beds required depends in the first place upon the maximum rate adopted; and, second, upon the area out

of use while being scraped and refilled. The higher the rate of filtration the less the total area, and therefore the first cost of the plant. The principal item of expense connected with the operation of this plant is that for scraping; and it is found that the amount scraped for any given quantity of water filtered is independent of the rate. Also, the allowance for the area out of use will not vary with the rate to any extent. Hence an increase in the rate will not by any means produce a proportionate reduction in the cost of filtration. A rate of 3,000,000 gallons per acre of bed in use will give results entirely satisfactory from the standpoint of efficiency, and at a cost which is usually by no means excessive.

The size of the individual beds will depend in part upon the extent of the total area, the smaller plants having necessarily to use smaller beds. A large bed costs less per unit of area than a small one, on account of the proportionately greater length of wall in the latter case. With a large bed it is, however, probably more difficult to obtain a uniform rate of filtration over the whole area.

During the winter of cold climates the cost of maintenance is considerably increased by the expense of removing the ice which forms in the bed. It is also difficult to avoid injuriously disturbing the surface of the sand. Beside this when the water is drawn down, the surface sometimes freezes before it can be scraped. On account of such disadvantages as these filter beds should be covered in all cold climates. The best method of constructing these roofs has already been referred to.

The proper number, shape and area of the beds of a system can only be determined for any particular case by careful study of the local conditions, and by making comparative estimates of the different items of cost of construction, maintenance, etc. There will be opportunities for the exercise of considerable ingenuity in the general laying out of the system, the relative placing of its parts, the arrangement of the piping, drains, etc., in order that convenience and economy may be happily combined.

THE COST OF CONSTRUCTION.

This will, of course, depend on the local circumstances and the kind of materials used. As in all hydraulic work, great care is required in the construction, and the best quality of materials must be used. In the main, it is the same class of work as is required in the building of distributing reservoirs.

FIG. 10.—FILTER BEDS AND CLEAR WATER BASIN AT ILION, N. Y.

ELLIPTICAL GROINED ARCHES USED IN ROOF OF WELLESLEY (MASS.) COVERED RESERVOIR.

The following table gives the cost of construction for several European and American filters:

Place.	Cost per Acre.	
	Covered.	Open.
London		$24,000—$40,000
Berlin (1884-87)	$66,000—$70,000	
Hamburg (1893)		30,500
Warsaw (1885)	78,000	
Zurich (1885)	86,000	
Nantucket, Mass. (1892)		45,500
Hudson, N. Y. (1874-88)		73,000
Ilion (1893)		96,700
Ashland, Wis. (1897)	80,000	
Somersworth, N. H. (1898)	64,000	
Poughkeepsie, N. Y. (1872)		90,000
Poughkeepsie, N. Y. (1896)		41,000

Lindley gives the general cost of continental filters as $45,000 per acre for open and $68,000 for covered.

The following figures, giving in detail the bids received February 15, 1898, for constructing the water filtration plant now in process of construction at Albany, N. Y., will be of more interest. When completed it will be by far the largest plant yet built in America; and in general design and completeness of equipment it will be second to none.

It will consist of a settling basin of 16,000,000 gallons capacity, eight covered filter beds, each with seven-tenths of an acre of sand surface, and a clear water reservoir with a capacity of 600,000 gallons. There will also be provided an office building containing fully equipped chemical and bacteriological laboratories.

The price for the sand and gravel included the necessary screening, washing and putting in place.

The sand-washer is of the ejector type. Other details are shown in Figs.

The bids are as follows:

Material.	Quantities.	Prices of Successful Bidder.	Prices of Other Bidders.		Engineer's Estimates.
Shale Rock Excavation					
Earth excavation (above grade).	5,000 cu. yds.	$1.20	$0.30 to	$1.50	$0.80
	60,000 cu. yds.	.27	.13¼ to	.476	.20
Earth excavation (below grade).	3,000 cu. yds.	.30	.20 to	.60	..40
Rolled clay and gravel embankments.	21,000 cu. yds.	.52	.45 to	.90	.50
Silt and loam filling	23,000 cu. yds.	.15	.15 to	.50	.20
General filling (rolled).	18,000 cu. yds.	.18	.07 to	.40	.20
Puddle in place	13,000 cu. yds.	.71½	.67 to	1.07	1.00
Broken stone or gravel for lining	1,900 cu. yds.	.85	.99 to	1.40	1.25
Sodding.	3,000 sq. yds.	.15	.15 to	.60	.15
Seeding.	8 acres	25.00	12.50 to	70.00	50.00
Gravel in roadway rolled.	800 cu. yds.	.60	1.00 to	1.50	1.00
Vitrified brick laid as paving.	120 M.	20.00	18.00 to	30.00	20.00
Stone curbing	800 lin. ft.	.60	.75 to	1.50	.50
*Concrete in floors	11,000 cu. yds.	2.31	2.34 to	3.50	3.00
*Concrete in vaulting.	7,000 cu. yds.	3.85	3.90 to	7.50	5.00
Other concrete	3,000 cu. yds.	2.13	2.50 to	4.30	3.00
*Brick work	4,500 cu. yds.	8.12½	7.00 to	10.00	6.00
Imp'd Portland cement	500 bbls.	3.12½	2.35 to	3.00	2.75
American " "	14,000 bbls.	2.14½	1.90 to	2.21	2.15
Rosendale cement	1,500 bbls.	.97½	.85 to	1.95	1.00
Furnishing & placing 2 in. drain pipe in piers		525.00	300.00 to	1,318.00	700.00
Two in. agricultural drain pipe	2,000 lin. ft.	.04	.05 to	.10	.05
*Six in. drain pipe open joints.	16,000 lin. ft.	.11	.10 to	.12 1-5	.10
Fur. and laying all vit. pipe cement joints		5,337.00	3,850.00 to	5,933.00	6,000.00
*Placing all gates, etc., furnished by board		1,140.00	700.00 to	2,000.00	470.00
*Furnishing and placing all cast-iron pipe and specials		20,701.25	14,750.00 to	20,000.00	15,000.00
*Iron filter covers	672 each	4.40	5.00 to	6.50	5.00
*Sand washing apparatus.	2 sets	393.00	250.00 to	1,000.00	800.00
*Sand run fixtures	8 each	407.50	100.00 to	511.00	200.00
*Regulator houses	8 each	862.24	175.00 to	900.00	500.00
*Office and laboratory building.		4,881.00	2,700.00 to	10,200.00	3,000.00
*Filter gravel in place.	7,000 cu. yds.	1.05	1.00 to	2.00	1.50
*Filter sand in place	36,000 cu. yds.	1.00	.90 to	1.78	1.25
Split stone lining	2,000 sq. yds.	.82	1.03 to	3.60	2.00
Rough stone paving	200 sq. yds.	.82	.93 to	2.50	.80
Fasteners furnished & placed in concrete vaulting.	3,000	200.00	150.00 to	225.00	100.00
Iron fence	850 lin. ft.	2.00	1.00 to	2.00	1.00
Connection with pumpwell and closing old intake.		3,000.00	1,000.00 to	4,000.00	3,500.00
Total.		$309,866	$322,358 to	$387,345	$322,440

* Items of special interest.

It will thus be seen that a covered filter plant of this area (5.6 acres) with settling basin, clear-water basin, and all other appurtenances complete can be built for less than $56,000 per acre.

For further details and information concerning this plant see "Engineering News," February 10 and October 20, 1898.

MAINTENANCE.

The total cost of maintenance of a filtration plant is made up of the operating expenses and the interest and sinking-fund charges.

The former—the operating expenses—comprise:

(*a*) The cost of superintendence and of attendants to look after the regulation, etc.

(*b*) The cost of scraping and removing the sand.

(*c*) The cost of washing the sand.

(*d*) The cost of replacing the washed sand when renewal of the bed becomes necessary.

It is only in very large plants that a special superintendent is required, so that the expense for that purpose would not form a very large part of the total cost. The proper handling of the gates and the running of the plant in general requires a degree of intelligence considerably above that of the ordinary laborer. The wages of the gatemen therefore will be from $2 to $3 per day.

Scraping and removing the sand by wheelbarrows seems to cost, under ordinary circumstances, between $40 and $50 per acre, depending upon the wages paid. At Mount Vernon, N. Y., the shovelers and barrow wheelers are paid $1.10 per day, and the scrapers $1.25. Mr. Chas. Fowler, for many years in charge of the filters in Poughkeepsie, N. Y., says that one man working one hour is required for every 150 square foot of surface cleaned and removed. This would cost at $1.50 per day about $43.50 per acre. Lindley gives thirty days at ten hours each for every acre, which at the same rate is $45 per acre. In the small plants at Ilion, N. Y., and Ashland, Wis., the cost is at the rate of about $50 per acre.

The cost of sand-washing varies with the method employed. In Poughkeepsie, when they used a simple inclined trough and water jet, it cost as high as $1.50 per yard. By improving their methods they reduced this cost, till to-day it is only twenty-seven cents per yard. In Hudson the cost is twenty cents per yard and in Ilion eighteen. In Germany it varies from fourteen to twenty cents per yard.

The periodical replacing of the sand in the bed must be done carefully, of course, but should not cost, including whatever is necessary to be done to the permanent layer, more than forty cents per cubic yard.

The cost of these various operations will of course depend upon the scale on which they are carried on. It will obviously be easier to keep the price low with a large plant than a small one. In the case of the former a force of gatemen and laborers can be permanently employed. In the smaller plants the operations of scraping and sand-washing only take place at intervals, and are performed by laborers hired temporarily for the purpose, or by employees from other parts of the water system.

In using the above data to make an estimate of the total operating expenses, we shall employ as a unit the cost per million gallons of water filtered.

Assuming an average yield of 50,000,000 gallons per acre between scrapings, the total cost would be as follows:

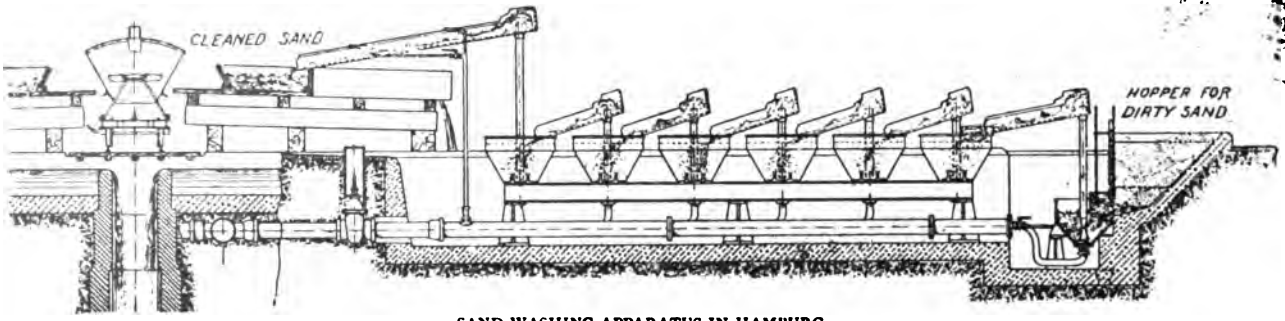
Scraping and removing at $45 per acre	$0.90	per million gallons filtered
Washing 100 cubic yards sand at 25 cents yard.	.50	" " " "
Replacing, etc., at 40 cents yard	.80	" " " "
Superintendence, etc	.25	" " " "
Total.	$2.45	

To this should be added the cost of bacterial analyses of the effluents which should be made as frequently as possible in order to test the working of the filters. In many of the European plants a fully equipped laboratory is included in the equipment, and some of the superintendents, like Piefké, Chief Engineer of the Berlin works, are also expert bacteriologists.

The actual cost of the operations discussed above for some American filters is as follows:

Poughkeepsie, N. Y., for 20 years averaged	$2.90	per million gallons filtered
Hudson, N. Y., is given as	1.38	" " " "
Mount Vernon, N. Y., a little less than	2.00	" " " "
Ashland, Wis., estimated to cost	2.25	" " " "

The following table, furnished by W. B. Bryan, Esq., Chief Engineer East London Water Company, gives the yearly cost of filtration of the London water companies from 1880 to 1895:



SAND WASHING APPARATUS IN HAMBURG.

FIG. 16.

COST OF FILTRATION PER MILLION U. S. GALLONS—LONDON WATER COMPANIES.

Name of Company.	1880-1	1881-2	1882-3	1883-4	1884-5	1885-6	1886-7	1887-8	1888-9	1889-90	1890-1	1891-2	1892-3	1893-4	1894-5
Chelsea	$1.17	$1.20	$1.10	$1.01	$1.06	$1.15	$0.80	$1.08	$0.83	$0.66	$0.72	$0.75	$0.62	$1.16	$0.60
East London	1.17	1.40	1.24	1.06	1.06	1.17	.97	1.22	1.29	1.50	1.42	1.54	1.42	2 63	1.69
Grand Junction	1.01	.95	1.40	1.73	1.82	1.35	1.40	1.75	1.56	1.22	1.33	1.24	1.30	2.00	1.68
Lambeth	.83	.81	.96	.93	.90	.90	.87	.90	.95	.88	.86	1.01	1.20	1.46	2.54
New River	1.34	1.15	1.41	1.11	1.02	1.01	.98	.93	.98	.90	1.02	.93	1.17	1.43	1.03
Southwark and Vauxhall	1.17	1.37	1.47	1.62	1.41	1.15	1.44	1.29	1.53	1.70	1.17	1.15	1.26	1.53	1.34
West Middlesex	1.67	1.54	1.74	1.67	1.30	1.07	1.70	1.01	.83	3.56	1.01	.97	1.42	.95	.96

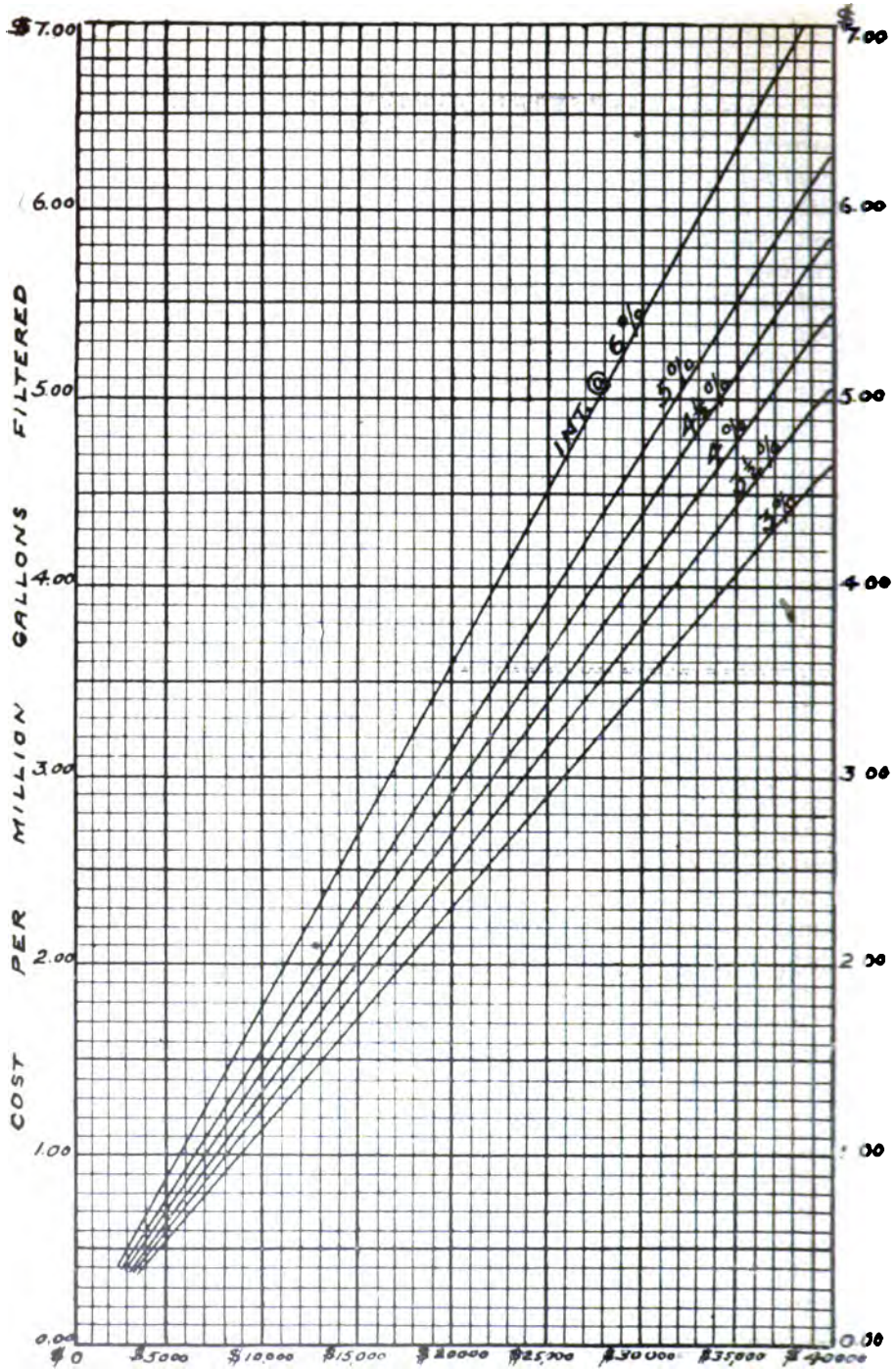
THE NEW YORK PUBLIC LIBRARY ASTOR, LENOX AND TILDEN FOUNDATIONS

To get the total cost of maintenance we must in[illegible] the operating expenses the charges for interest and s[illegible]king funds. This will, of course, depend upon the cost of construc[illegible]on, [illegible] and the latter will vary with the maximum rate of filtration [illegible] and the proportion of the total area to be out of use while being cleaned. These being decided upon, it will then be easy to calculate the first cost per million gallons of daily yield. For example, if, with the rate chosen, the daily yield of the plant will be 2,000,000 gallons per acre of the total area of beds, the first cost per million gallons will be half the cost of construction per acre, and so on. The diagram gives the cost per million gallons filtered, corresponding to different construction costs, which will pay the interest and sinking fund charges necessary to cancel the whole first cost with interest at the end of forty years.

For example, with a first cost of $60,000 per acre, and a net yield of 2,000,000 gallons per acre of total area, the cost per million gallons with interest at 4 per cent. would be $4.15.

The amounts taken from the diagrams added to the estimated cost of operation will give the total cost of maintenance per million gallons of water filtered. With interest at 4½ per cent. and a first cost of $80,000 per acre, this would amount to about $6. Add to this $2.50, for the expense of operation, and we should have $8.50 as the total cost of filtering 1,000,000 gallons of water, or 1,000 gallons for less than nine-tenths of a cent. With open filters, or more favorable local conditions, this charge would be considerably reduced.

Having now discussed the method and cost of sand filtration, the next and last question to be considered is the nature of the results which this process can be depended upon to produce. There can be no question as to its efficiency from an æsthetic point of view. The complete removal of even the most minute particles in suspension, together with a large part of the dissolved organic matter, insures the entire elimination of any characteristics the water may possess which would be disagreeable to sight, taste or smell. Yet it is because of the effectiveness of the purification from a sanitary standpoint that this system is especially noted. This is due, as we have seen, to its destructive effect upon the bacteria, which is almost sufficient to cause their entire disappearance during the passage of the water through the filter. The average reduction in a well designed and well managed plant will be as great as 98 or 99 per cent., as shown by comparing the number of germs in the effluent with that in the applied water. But in reality it is even greater than this. For it has been shown that of the few



FIRST COST OF BED PER DAILY CAPACITY OF ONE MILLION GALLONS.

Diagram Giving that Portion of the Cost of Filling a Million Gallons of Water which is Necessary to Provide for Interest and 40 Years Sinking Fund.

bacteria which are present in the effluent, a certain number come from the underdrains, and have therefore not passed through the filter at all. These belong to some of the species of water bacteria, and, consequently, will be quite harmless. From tests made on the experimental filters at Lawrence with an easily recognized and hardy species, the actual reduction was found to be from 99.9 to 100 per cent. Now, when it is considered the filter is capable of producing such effects upon bacteria which exist normally in water, it will be evident that the effect upon the pathogenic or disease germs which are out of their natural habitat and in a decidedly unfavorable environment will be much greater. Thus what may be called the "hygienic efficiency" of this system must be remarkably high. The process is comparable to nature's method of purifying the surface water which furnishes the underground supplies; and if properly carried out, the water produced is probably of almost equal wholesomeness. The continued experience of places where sand filtration plants have been in operation for some time only goes to strengthen this conclusion.

In America the method is only just beginning to be employed. Up to the year 1892 there were but two plants of this description in the country, viz., those at Hudson and Poughkeepsie, which have been already referred to. Since that time fourteen new ones have been completed and three others are under construction, the latter including the large plant at Albany. The experience to be derived from these plants is too limited to be of much value for some time to come; but the officials connected with the majority of them have invariably expressed their entire satisfaction with the method of working and with the results obtained.

In England and the continent, however, the experience of many years is available, this method, as we have seen, having been used long before the *rationale* of the process was understood. In England particularly, many of the supplies are from surface waters made available by means of large storage reservoirs; and in nearly every instance the stored water is filtered before being supplied to the consumers. The new supply for Liverpool, which was put into operation in 1892, comes from an artificial lake formed by damming the Vyrnwy river in Wales. This lake is sixty-eight miles from Liverpool and lies in a sparsely inhabited district remote from railways or towns. Yet the water from this source, safe as it may appear, is also made to pass through a sand filter before being allowed to enter the distribution pipes. In Germany the use of any surface water without filtration is prohibited by law.

But in addition to the high esteem in which the method is held wherever it has been used, there are certain health and mortality statistics which are perhaps of even greater significance. The typhoid fever death rate is now considered to be a pretty good index of the purity of a city's water supply. Keeping this in mind the following* tables prepared by John W. Hill, M. Am. Soc. C. E., will be found to furnish interesting information in this connection.

TABLE I.—TYPHOID FEVER DEATH RATE.

CLASS I.—10 or less per 100,000 of Population.

City.	Source of Water Supply.	1890	1891	1892	1893	1894	Av'g for 5 yrs.
The Hague	Filtered from sand dunes	3	12	4	2	3.4	4
Rotterdam	Filtered from River Mease	6	4	6	5	4.8	5.2
Christiania		12	9	4	6	3	6.6
Dresden	Filter Gallery by River Elbe	9	8	5	4.5	8.2	6.9
Vienna	Springs in the Schneeberg	9	6	8	7	5	7.0
Munich	Spring water from Mangfall Valley	8	7	3	15	2.5	7.1
Copenhagen		9	8	7	9	6.7	7.9
Berlin	Filtered from L. Tegel and River Spree.	9	10	8	9	4	8.0

CLASS II.—10-20 per 100,000 of Population.

Breslau	Filtered water from River Oder	15	12	15	10	6.1	11.6
Amsterdam	Filtered from Haarlam dunes	19	11	15	16	8.5	13.
Stockholm		18	18	19	8	8.3	14.
Brisbane		—	—	—	19	9.6	14.
London	Kent Wells, 17 per cent. Filtered from Thames and Lea, 83 p. c.	16	15	11	16	15	14.6
Edinburgh	Filtered from reservoir in Pentland Hills	19	18	13	14	15	15.6
Trieste		12	11	26	17	19	17
Brooklyn	Impounded and well water	26	20	17	17	15	19

CLASS III.—20-30 per 100,000 of Population.

New York	Impounded from Croton and Bronx rivers	21	22	22	20	17	20.4
Davenport	Filtered from Mississippi river	19	10.8	34.6	16.7	26	21.4
New Orleans	Rainwater from tanks and cisterns	20	23	21	15	28	21.4
Sydney, N. S. W.	Impounded from Upper Nepean	—	—	20	19	29	21.6
Hamburg	From River Elbe, filtered since May, 1893	28	23	34	18	6	21.8
Buda Pesth	Ground water from wells	34	23	26	15	14	22.4
Glasgow	Lake Katrine	26	31	18	20	24	23.8
Brussels		26	41	23	27	14	26.
Paris	Rivers Seine, Marne, Vanne, Ourqc canal, artesian wells and springs	30	20	28	25	29	26.4
Manchester	Lake Thirlmere	31	39	25	25	18	27.6

* From an address on "Water Supply for Cities," given by J. W. Hill, C. E., before the Faculty and Students of the University of Illinois, Jan. 21, 1896.

TABLE I.—Continued.

CLASS IV.—30-40 per 100,000 of Population.

City.	Source of Water Supply.	1890	1891	1892	1893	1894	Av'ge for 5 yrs.
Venice.		44	33	30	26	18	30.2
Milwaukee.	Lake Michigan.	33	33	31	37	26	32.0
Rome.	Fontanadi Trevi, Aqua Felice & Paoli..	35	36	26	34	30	32.2
Boston.	Lake Cochituate and Sudbury river....	43	33	29	30	28	32.6
Detroit.	Detroit river.	18	13	51	61	26	33.8
Dayton, O.	Driven wells	20	32	44	64	20	36.0
Turin.		46	41	44	29	24	36.8
Liverpool.	Lake Vyrnwy.	24	25	25	53	58	37.0
Buffalo.	Niagara river.	—	50	34	37	36	39.2
Providence.	Pawtuxet river	29	47	39	34	47	39.2
Covington.	Ohio river.	43	45	40	27	42	39.4

CLASS V.—40-50 per 100,000 of Population.

San Francisco	Impounded from mountain streams.....	59	41	34	32	35	40.2
Prague.		33	37	53	36	57	43.2
Minneapolis.	Mississippi river.	81	45	36	60	45	45.4
Baltimore.	Lake Roland, Gunpowder river.....	57	34	42	47	49	45.8
Newark.	Impounded from Pequannock river since April, 1892.....	60	81	45	28	15	45.8
St. Louis.	Mississippi river.	34	30	37	103	31	47.0
Newport, Ky.	Ohio river.	—	—	—	58	37	47.5
Philadelphia.	Schuylkill and Delaware rivers.....	64	64	40	41	32	48.2
Denver.	South Platte river	—	—	53	57	35	48.3
Cleveland.	Lake Erie.	66	52	54	47	27	49.2

CLASS VI.—50-60 per 100,000 of Population.

St. Petersburg.	Filtered from River Neva.....	57	—	—	51	49	52.3
Cincinnati.	Ohio river.	67	62	40	43	50	52.4
Moscow.	Springs, ponds, Moscow & Yanza rivers.	73	75	68	40	29	57.
Toronto.	Lake Ontario.	93	94	43	42	17	57.8
Quincy, Ill.	Filtered from Mississippi river.....	76	28	48	58	79	58.
Dublin.	Filtered from River Vartry.....	62	58	39	87	48	58.8

CLASS VII.—Over 60 per 100,000 of Population.

Knoxville.	Filtered from Tennessee river.....	101.5	45	36	67	59	61.9
Milan, Italy.		—	—	62	62	—	62.
Jersey City.	Passaic river.	91	95	53	60	76	75.
Washington.	Potomac river.	83	83	70	66	71	76.6
Louisville, Ky.	Ohio river.	88	81	72	84	72	79.4
Chattanooga.	Tennessee river.	145	66	55	86	48	80.
Chicago.	Lake Michigan.	83	160	104	42	31	84.
Pittsburgh.	Allegheny river.	—	100	100	111	56	91.7
Lowell, Mass.	Driven wells, Merrimac river.....	158	98	90	61	55	92.4
Atlanta, Ga.	Filtered from Chattahoochie river.....	149	119	87	66	43	92.8
Lawrence, Mass.	Filtered from Merrimac river.....	123	115	102	93	48	96.2
Alexandria, Eg't.	River Nile.	208	348	77	79	100	162.4
Cairo, Egypt.	River Nile.	260	233	163	154	135	189.4

TABLE II.—TYPHOID FEVER DEATH RATE.

Death Rate per 100,000 of Population, arranged upon Basis of Death Rates for 1894.

CLASS I.—Less than 10.		CLASS II.—10-20.		CLASS III.—20-30.	
Munich.	2.5	Brussels.	14	Dayton, O.	20
Christiania.	3.0	Buda Pesth.	14	Turin.	24
The Hague.	3.4	London.	15	Glasgow.	24
Berlin.	4.0	Edinburgh.	15	Milwaukee.	26
Rotterdam.	4.8	Brooklyn.	15	*Davenport.	26
Vienna.	5.0	Newark.	15	Detroit.	26
Hamburg.	6.0	New York.	17	Cleveland.	27
Breslau.	6.1	Toronto.	17	Boston.	28
Copenhagen.	6.7	Manchester.	18	New Orleans.	28
Dresden.	8.2	Venice.	18	Moscow.	29
Stockholm.	8.3	Trieste.	19	Sydney, N. S. W.	29
Amsterdam.	8.5			Paris.	29
Brisbane.	9.6				

CLASS IV.—30-40.		CLASS V.—40-50.		CLASS VI.—50-60	
Rome.	30	Covington, Ky.	42	Cincinnati.	50
St. Louis.	31	*Atlanta, Ga.	43	Lowell, Mass.	55
Chicago.	31	Providence, R. I.	47	Pittsburgh.	56
Philadelphia.	32	Lawrence, Mass.	48	Prague.	57
Denver.	35	*Chattanooga, Tenn.	48	*Knoxville.	59
San Francisco.	35	Dublin, Ireland.	48		
Buffalo.	36	Baltimore.	49		
Newport, Ky.	37	St. Petersburg.	49		

CLASS VII.—Over 60.	
Milan.	62
Washington City.	71
Louisville.	72
Jersey City.	76
*Quincy, Ill.	79
Alexandria, Egypt.	100
Cairo, Egypt.	135

*Mechanical filters.

These figures show that the lowest rates are for those cities deriving their supply either from springs or from surface waters which have been subjected to sand filtration carried out in accordance with the strictest modern requirements. They also indicate the general inferiority of the water supplied to American cities when compared with European supplies. Chicago and Berlin have about the same population, yet the typhoid death rate of the former is more than ten times that of the latter; or, in other words, the chances of contracting typhoid fever in Chicago are ten times as great as in Berlin.

Out of the many instances showing the beneficial effect of filtration with regard to the prevalence of certain infectious diseases, two of the most noted will be cited, one in Europe and the other in America.

Hamburg and Altona, though under separate governments, practically form one continuous city with a joint population of about 800,000. They both draw their water supplies from the sewage polluted Elbe river upon which they are situated. Altona is the nearest to the mouth of the river, and its water intake being three or four miles further down is below the outfall of both its own sewers and those of Hamburg. The Hamburg intake is about two miles above the city. In 1892 an epidemic of cholera occurred, during which Hamburg, with a population of 622,530, had 17,975 cases with 7,611 deaths, while Altona, with 143,000 population, had during the same time 562 cases and 328 deaths, and in many of the cases credited to Altona the disease was contracted in Hamburg. Wandsbeck (20,000), just across the river from Hamburg, enjoyed the same immunity as Altona. Both of these places purify their water supplies by sand filtration, while in Hamburg the only attempt in that direction was the employment of settling basins. A filtration plant was, however, in process of construction at that time, and was put in operation in May, 1893, since when the typhoid rate has diminished from about 30 to 6 per 100,000.

The other case is that of Lawrence, Mass., which is situated on the Merrimac river, a few miles below Lowell. In spite of the great dilution, the water of this river which supplies both cities is seriously polluted by the sewage draining into it from the towns built along its banks; and as a consequence the typhoid fever rates in both places were unusually high.

In September, 1893, a system of intermittent sand filtration was completed. The effect upon the health of the citizens is shown in the following figures:

Year.	Deaths from Typhoid Fever per 100,000 Population.	
1887.	114	
1888.	114	
1889.	127	
1890.	134	
1891.	119	
1892.	105	
1893.	80	
1894.	47	(23)
1895.	31	(17)
1896.	19	(4)
1897.	16	

For the last four years the figures in the brackets represent the number of deaths among people (principally mill operatives) who were accustomed to drink canal water without filtration; so that the actual reduction in the death rate which should be credited to the filters is much greater even than the figures indicate.

Many attempts have been made during the last twelve or fifteen years to improve upon the sand filter, but so far without success. Some of the methods invented involve less expense for construction or give better chemical results; but the thoroughness of the bacterial purification effected by the sand bed has not been equaled by any.

The only one of these methods which has been used to any considerable extent is the American or mechanical system of filtration, which is employed in several places in the United States. Sand is the material used in this process also, but it is contained in cylindrical wooden or iron tanks. The water enters the tanks, sometimes under pressure, and is driven through the sand at a rate fifty times as great as the maximum allowed in the case of the filter bed. For this reason the latter method is sometimes referred to as slow sand filtration. With such a high rate the surface film must be formed artificially; and this is done by adding a solution of alum to the water, which forms with the carbonates present a white flocculent precipitate. Such a filter will, of course, soon become clogged; but it can be quickly and easily cleaned without removing any of the sand from the tank. The results produced, under test conditions at least, are undoubtedly good; and it has the advantage over the filter bed of somewhat lower first cost. On the other hand, the charges necessary for repairs and depreciation will be considerably higher on account of the less permanent character of its construction; so that if proper allowance could be made for this, the difference in the actual cost of filtering a given quantity of water by either process would not be very great. In any case it will probably not involve an addition of more than 10 per cent. to the ordinary cost of the water. Indeed, calculations have been made showing that if a proper valuation is put upon the lives saved by its use, the construction of a filtration plant is often in the long run a source of economy. Such considerations, however, seem quite unnecessary. A city's water supply should be pure, wholesome and attractive in appearance, just as the streets should be clean and well paved, and the public buildings architecturally beautiful. Besides, having gone to the expense of obtaining a public water supply, indifference with regard to its purity or unwilling-

ness to provide for it would seem to be utterly unreasonable, especially when it can be secured for such a comparatively small increase in the total cost as sand filtration involves.

It would be much cheaper, of course, to purify only that part of the supply which is used for purely domestic purposes. But that would require a double set of distribution pipes, and we should also lose the satisfaction of knowing that the whole of the public supply could be used for any purpose with perfect impunity so far as health is concerned. And when we consider that the expense of filtering the whole supply only amounts to two or three cents per month for each consumer, it will scarcely be considered excessive.

In conclusion, the author wishes to acknowledge his obligation to Messrs. Chas. R. Bettes, Chief Engineer Queens County Water Company, Far Rockaway, N. Y.; A. N. Russell, Secretary Water Commissioners, Ilion, N. Y.; G. E. Hoffmaster, Manager Suburban Water Company, Mount Vernon, N. Y.; Sam. Wheeler, Superintendent, Ashland, Wis., for their courtesy in furnishing him with valuable data and information; also to W. B. Bryan, M.I.C.E., Chief Engineer of the East London Water Company, for the opportunity to make personal observations of the working of the large plant under his control.

BAD PLUMBING—SMOKE TEST EXPERIENCES.

Some time since I was appointed by the Board of Health of a neighboring city to make the smoke tests required when the examination of the plumbing system in a building was necessary, and the work has led to some very peculiar experiences and cold receptions, which finally resulted in friendship with the occupants of the building, and in many instances in profitable trade. In one case on applying at the house and informing the servant what was desired, I received word from the mistress to go away, that no order had been given for me to do any testing.

I went to the officer of the Board of Health and reported my experience, and he returned with me to the building, but we were unsuccessful in gaining admission until the policeman was called, and then our explanation secured us the opportunity to make the test. When the system was filled with smoke, leaks were found in the cellar, the kitchen and the bath-room. I then requested the servant to inform the lady of the house, and on her appearance explained to her what I had found, when she accompanied me to

each of the leaks, and on understanding for the first time the use of the various pipes and the effect of leaks in them, I was given the order to make everything right. This was done in due time, and after the work was completed I made another smoke test, without difficulty in gaining entrance to the house, and had for an interested spectator the mistress of the house, who searched as diligently as I did to find any possible leaks, and I was not more gratified than she to know that the work was absolutely tight.

In another instance the doctor attending a case of fever requested me to make a test of the plumbing in the building, and here again the privilege was refused, and the request of the doctor in person with me afterward was unavailing, until an application to the Board of Health was made for an order, when, accompanied by a constable, and much to the disgust of the house owner, the test was made. Adjoining the chamber in which the fever patient was confined was the bath-room, and the soil stack in the building ran up in a corner formed by the wall partition, so that gas escaping through any breaks in the joints below might readily pass up around the pipe and find its way through openings in the woodwork and plaster into the chamber. Upon applying the smoke test smoke entered the sick chamber and the bath-room in equal quantities, while a leak at the floor connection of the water closet was also discovered. The soil stack was found to have two badly split hubs exposed in the basement, and on having the lady of the house examine these defects while the smoke was issuing from them, and explaining the uses of the pipes and, with the doctor's assistance, the dangers arising from leakage, I again received orders to make repairs, and after completing them another test was made, showing the system to be in good condition.

Although this town is a short drive from my shop, through these two particular smoke tests I have secured a great deal of plumbing work, and have men working there as regularly as in the town where my shop is located. I would point out that in both of these instances the reception I had was particularly exasperating, and had I not controlled my temper and pursued an intelligent course I should have incurred their enmity and lost the increase in business that has resulted. I am of the opinion that if anybody will make a specialty of the smoke test, using in connection with it an abundance of patience and good nature, and carefully explaining to customers the condition of their plumbing systems, it cannot but result as it has in my case—in profit to those who try it.—By P. R.—From "The Metal Worker."

THE CHICAGO CANAL—A MENACE TO HEALTH.

Prof. HIRAM PHILLIPS, consulting engineer of the Missouri State Board of Health, has completed his investigations of the proposed Chicago drainage canal, and reports that it will be a constant menace to the health of all persons living along its borders. On his findings the State Board of Health will probably base its conclusions in that regard.

Prof. Phillips is an authority on causeways, water supplies and the sanitary condition of rivers and streams. He at one time was Professor of Sanitary and Civil Engineering at the Missouri State University, and of recent years has been employed in various States of the Union to construct canals, causeways and water supplies. His investigation of the proposed scheme of Chicago to dump its sewage into the Mississippi river has been systematic and thorough, from the standpoint of a capable expert and competent engineer.

His views, as submitted to the State Board of Health, are as follows:

"The city of Chicago is expending millions of dollars in building a canal from Lake Michigan to the Illinois river. Beginning at the south branch of Robey street, in Chicago, the canal will run to Lockport and thence down the Desplaines river to Joliet, thence along the Illinois and Michigan canal to the Illinois river. In addition to serving the purpose of commerce the canal will be used as a huge open sewer. The sewage will not be treated to purify it before turning it into the canal, but dilution with water will be depended on to cleanse the canal and prevent the existence of unsanitary conditions along the path of the canal.

"The sanitary district which will empty its sewage into the drainage canal, and thence into the Illinois and Mississippi rivers, comprises all of the city of Chicago north of Eighty-seventh street, together with some forty-three square miles of Cook county outside of the city limits. The population of this district in 1894 was 1,503,000 inhabitants, and in 1896 the population had increased to 1,750,000 inhabitants, and at the present time the population of that district probably will reach 2,000,000 people.

"The law under which the canal is being constructed requires that the canal shall be of sufficient capacity to permit of a flow of 20,000 cubic feet a minute for each 100,000 inhabitants. Work was begun on the canal in 1892. Through the rock sections of the

district the section of the canal was designed for a flow of 60,000 cubic feet a minute, while in the other part of the district the section was designed for a flow of 30,000 cubic feet a minute, which would be the requirement for 1,500,000 pepole, the intention being to increase the capacity of the canal by dredging as the population of the district increased.

"It will be seen from the figures that while the canal was of ample size for the population of the district in 1894, the narrower portions had become too small as early as 1896, and, at the present rate of increase in the population, it will be only a few years until even the larger sections of the canal will be inadequate to accommodate a flow of 20,000 cubic feet a minute for each 100,000 inhabitants.

"The scheme for the disposal of Chicago sewage has been pronounced by experts as practically fulfilling the sanitary requirements for sewage disposal. While we do not question the integrity of the experts who decided the matter, we must take into account all of the circumstances under which the decision was rendered. If it were only a question of the disposal of Chicago sewage the canal scheme undoubtedly is a better one than the present plan of emptying the sewage into Lake Michigan, whence the supply of water is obtained. Chicago will be benefited. But how about the other cities, whose water supply will run the risk of pollution by the contents of the drainage canal? A sluggish stream, like the Illinois river, does not aerate and purify its water like a more rapidly flowing river. At one point the fall is only seven feet for a distance of sixty miles. Think of it—a fall of one and one-half inches a mile! Surely such a stream cannot be depended upon to mix and purify sewage emptied into it.

"Unless the original scheme shall be modified and some system of purification adopted to assist dilution, the drainage canal will in a few years become a constant menace to the health of the inhabitants on its borders. This is a vital question to Missourians, as nearly one-third of the inhabitants of this imperial commonwealth derive their water supply from the Mississippi river.

"This matter has been brought to the attention of Congress by one of our representatives, and it is hoped that it will result in a national law preventing the pollution of waterways with sewage."

The State Board of Health of Missouri is confronted with the problem whether it were better to abandon streams as a source of water supply and make them a system of open sewers, or, by sanitary provisions, guard against their pollution?

Without the garbage of the Chicago canal pouring its poison and filth into the Mississippi, the problem of sanitary waterways from which the people of Missouri in large numbers draw their water, already is a serious one in the minds of scientists and thinkers.

In the report of Prof. Phillips to the State Board of Health on the water supplies of Missouri, he says:

"There is a generally accepted theory that running water will purify itself in remarkably short distances, but polluted water, like a stained reputation, is never looked on entirely without suspicion. It has not been determined definitely how long typhoid fever germs will survive, or to what distance they may be carried by water, before losing their vitality.

"Every water supply is affected by local surroundings and climatic conditions. In new and sparsely settled countries the question of a pure water supply is a simple matter. But as the number of inhabitants increases and cities are built and the proportion of tilled to untilled land increases, the question of water supply becomes a very serious problem. Primeval forests conserve the rainfall and convey it to the rivers and springs gradually, but when the land has been cleared for cultivation a greater or less amount of rainfall is carried immediately to the rivers. The rivers thereby lose their uniformity of flow and become raging torrents in the wet season and correspondingly low in the dry season. The sewage of the cities is emptied into the rivers, and often in such proportion to the amount of water in the river that purification by nature is impossible. Therefore, to maintain the water supply pure, as civilization advances man must adopt measures to counteract the evil effects from this cause. In the northern portion of the State the cleared land and city sewage make it absolutely necessary to assist nature in purifying the water supply.

"There are several sources of water supply in the State: rivers embracing all streams with continuous flow throughout the year; creeks with intermittent flow and dams to hoard the supply; empounding reservoirs, artesian wells, shallow wells, springs and cisterns.

"Of the seventy public water supplies in the State, twenty-four cities, containing 717,367 inhabitants, obtain their water from rivers; ten cities, with 45,779 inhabitants, from creeks; three cities, with 21,377 inhabitants, from empounding reservoirs; nine cities, with 23,681 inhabitants, from artesians; nine cities, with 23,351 inhabitants, from shallow wells; seven cities, with 44,192 inhabitants, from springs.

"From the above figures of the total population of Missouri of 2,679,184 inhabitants, 32 per cent., or 874,927, are provided with a public supply of water. While it is true that a large per cent. of the population of the smaller cities is not directly supplied with hydrant water, the public health is affected directly by the quality of water for public use.

"The pollution of water may be in two forms, suspended matter or chemical solution. The suspended matter may be mineral or of animal or vegetable life.

"In reservoirs or lakes the mineral matter will in time almost wholly subside, but animal and vegetable life will thrive and multiply. The water from deep wells is very often heavily charged with minerals in solution, in such marked degree that it is useful for medicinal purposes. Others, while not unpleasant to the taste, are unfit for steaming or manufacturing purposes. The most common objection to deep well water is its hardness, which may be either temporary or permanent. The water from shallow wells or springs, if in densely populated communities, always is liable to be contaminated by surface washings.

"The matter in suspension can be removed by several methods of filtration or sedimentation, but those in solution only can be removed by distillation or chemical action.

"The presence of most forms of suspended matter can readily be detected with the eye, but the matter in solution can be definitely determined only by the taste. The presence of microscopic organisms is only determined by the use of a powerful lens.

"So long as our streams were polluted only by surface washings and vegetable refuse from cultivated lands, the necessity of sanitary restrictions in disposing of waste products was not so urgent nor its necessity so apparent.

"Only twenty-four cities have sewers out of the seventy which have waterworks. Of these a great many have sewers which are very incomplete, defectively designed and poorly constructed. They are of all conceivable systems and some without any system. All discharge into streams without any pretense of filtration or purification.

"It is undoubtedly within the province of the State to protect its citizens from the use of polluted water. There is a very narrow line between meddling with one's private affairs and compelling him to obey such laws as will insure his own as well as the public health."

THE UTILIZATION OF CITY REFUSE.*

By W. F. Morse.

THE DISPOSAL OF ORGANIC WASTE.

Four years ago a statement was made by a distinguished English scientist to the effect that the waste produced by each inhabitant of a city was sufficient, when properly burned, to supply each individual with an electric light of eight candle power for two hours every night in the year. At the time this was thought to be a somewhat fanciful assertion, and impossible to be realized. But the development and progress of garbage and waste disposal by cremating furnaces, under varied forms and conditions, has proven that the statement is in a fair way to be demonstrated.

It is certain that the combustible waste which forms a considerable proportion of the whole collection of city refuse can be utilized or employed for fuel to destroy the organic matters, and thereby save a large percentage of the expense of disposal work as hitherto carried on.

City refuse may be roughly classed under three heads:

Organic: Garbage and kitchen offal, bodies of animals, condemned foods, market refuse and putrescible matters of every kind, about. 17 to 20 per cent.
Combustible refuse, about ..... 20 to 25 per cent.
Inorganic: Street sweepings, ashes, including broken glass and crockery, yard and floor sweepings, oyster and clam shells, and also trade refuse in large quantities, about ..... 55 to 63 per cent.

When three separations can be made of the garbage, combustible refuse, and ashes and street sweepings taken together, and when the two first items are brought together at one convenient point, there can be constructed disposal plants which shall destroy the garbage by utilizing the heat obtained from the worthless parts of the refuse, at so small a cost as to make the work practically self-supporting.

* Continued from page 220.

The operation of the waste disposal plant just established in the city of Boston has shown that it obtains from the destruction of a comparatively small percentage of refuse sufficient heat to move all machinery required for its operating, heating and lighting, and also a large proportion of heat units that cannot at present be utilized.

It follows naturally that the extension of this principle to its utmost available limit, and the utilization of these units of heat for the disposal of organic substances, is not so difficult to be accomplished as was formerly supposed. There are two or three conditions which must be predicated in advance.

A separation of the garbage from ashes and refuse should be made. The garbage should be collected with not more than 10 per cent. admixture of foreign matters, and with as small an amount of liquid as is possible.

The refuse must also be separated from ashes and garbage and kept in a dry condition. It may include everything which enters into the household life of the people, excepting only kitchen offal and ashes. Under the usual separation in New York and Boston, it includes tin cans which are used for dry substances, as well as every class or grade of paper, cardboard, rags, empty bottles (excepting those for catsup or sauces), carpets, old shoes and rubbers, worn out or superfluous clothing, carpets and rags, broken or worthless furniture, boxes, barrels, excelsior, mattresses—every discarded article that has been employed in the home life of the household, shops or factories.

To utilize the heat from the burning of material and apply it effectively for the cremation of organic waste has necessitated an entirely new departure in the art of constructing cremating furnaces; and this, after elaborate experimentation and great expenditure of time and money, has been successfully accomplished.

It has been demonstrated that the mixed material of city waste collections can be destroyed chiefly by means of its own fuel—with the use of a very insignificant amount of coal or wood to start the process. In a city where coal and wood are held at a price of fifteen to twenty dollars per cord and ton, and where a furnace has been in operation for two years destroying the mixed garbage and refuse of the community, no fuel has been required, with the exception of a few sticks of wood to begin the work. Therefore the problem of disposal of organic waste by utilizing the combustibility of the products cast off by the community has been solved.

That this process is practicable in the majority of American cities is certain; and that it can be done without objection on a sanitary score is positively determined by the use of approved apparatus for consuming the products of combustion. Every particle of carbon and smoke is converted into gas, and after being passed through a boiler, discharged in an almost invisible condition as it issues from the chimney. For several years there has been destroyed in the largest city of this country, on one of the main avenues, a quantity of garbage, offal and manure equivalent to one ton daily, without the slightest objection or complaint of nuisance from any one in the building or the surrounding houses.

The employment of this system of destroying organic wastes by combustible refuse is certain to be adopted when thoroughly understood by the authorities of cities, because it is distinctly a step in advance of the present methods of employing fuel in large amounts and of throwing away the combustible refuse.

DISPOSAL OF WASTE OF PUBLIC INSTITUTIONS, HOSPITALS, FACTORIES, DEPARTMENT STORES, HOTELS AND PRIVATE DWELLING HOUSES.

Within the past year it has frequently happened that returning soldiers have brought to this country various forms of disease that called for not only immediate attention, but the radical and thorough treatment that is required to prevent the spread of contagious and infectious diseases. The hospitals of the eastern cities of the United States have been called upon to furnish room and treatment for many suffering soldiers who could not be received or treated in the army hospitals. This has induced an examination into the resources of institutions as regards isolation, disinfection and the disposal of matters that produce and propogate contagious diseases, and has shown in many cases a deficiency of equipment which demands remedy.

The total destruction of articles which have been in contact with an infected person, or their disinfection and sterilization, is imperative. To check the spread of an epidemic, nothing is so efficient as to destroy by fire everything that threatens to perpetuate contagion. To do this by a sanitary and economical process demands the construction of a separate apparatus in connection with and utilizing the heat and draft of the chimney of the institution.

Within the past twelve years there has been built and put into

operation in hospitals, institutions, hotels, etc., in this and other countries, a large number of small furnaces which destroy all infected matter, which consume all kitchen garbage and waste, and which will incinerate all combustible waste of any kind produced within the building. These furnaces, called for convenience "Hospital Destructors," are built with special reference to the space or ground which may be available, also with reference to connection with the main chimneys or boiler flues of the institution. They are made of steel plates bolted together and lined throughout with fire-brick. They are strengthened by transverse longitudinal and perpendicular steel bars bound together, provided with openings and doors which will admit large and bulky articles, and which will allow the organic waste to be placed in the furnace without loss of time and with a minimum of labor. A small amount of fuel is used whenever organic waste alone is to be destroyed; but when combustible refuse is also brought to the furnace, no other fuel is needed. The furnaces are moderate in price and especially adapted in size to the amount and character of the material to be destroyed. They are all provided with apparatus for the consumption of smoke, malodorous substances and offensive gases, and are operated by the usual labor attached to the institution, hotel, store or factory.

The use of Destructors and the employment of this special apparatus in the larger hospitals has become a necessity, and their efficiency and usefulness are certified to by many of the leading sanitarians and physicians in the country.

For pathological laboratories and medical colleges, where the work demands an unusually powerful and absolutely perfect apparatus, and one which may also be operated by oil or gas; a special form of Destructor is built. The experience gained in the construction of Mortuary Furnaces for the incineration of human bodies is in these cases brought to serve, and the results in every point of thorough and rapid combustion, with entire absence of offence, are fully assured.

The same principles, applied in a similar way, in furnaces suited to the particular character of waste to be consumed, can be made equally effective for the destruction of factory or stable waste. Anything that fire can affect may be destroyed with the same sanitary protection and under precisely similar conditions, as the disposal of waste of cities or institutions is done. For hotels and large dwellings, where often the waste produced is a troublesome

nuisance to get rid of, this method of cremation on the premises offers a ready and certain relief.

DISINFECTION AND STERILIZATION BY STREAMING-STEAM CURRENTS.

No modern hospital can be said to be complete in equipment without the addition of an apparatus which shall disinfect clothing, bedding and other articles which have come in contact with patients suffering with infectious diseases, and which thereby saves not only the cost of the articles which formerly had to be destroyed, but also provides against the spread of contagion by the prompt disinfection of everything that is liable to contain disease germs.

The surgical instruments, dressings and bandages employed by the faculty of institutions are sterilized rapidly and efficiently by the many forms of small apparatus which are used throughout the country. But few hospitals are provided with the larger steam disinfecting chamber which will permit mattresses, bedding and clothing to be cleaned and renewed in such a way as to be again available for use. It has been proved by experience that steam is the most efficient agent to be employed in disinfection on a large scale; that under conditions where cases or epidemics of contagious disease are found, it is only by the use of steam at a high temperature that articles which have been exposed to contagion can be purified and restored to usefulness.

In England and on the Continent almost every municipality is provided with a public steam disinfecting apparatus, which is a large factor in the preservation of the public health. In addition thereto every public institution and private sanitarium has its own equipment for personal use. In the United States the employment of this apparatus is as yet comparatively rare. Few cities are provided with general disinfecting stations, and the institutions, while feeling the necessity, have not the funds available for installing plants, owing largely to the heretofore excessive cost of the equipment.

The time has come when a steam sterilization plant, guaranteed to be perfectly efficient and economical in operation, can be built for a very much less sum than the complicated devices which have been employed hitherto.

The principle employed in the use of streaming-steam currents passing rapidly through the articles to be disinfected, under con-

ditions which do not allow the condensation of moisture and the consequent saturation of the goods. In opposition to this principle is the one mostly in use in this country, of a still current under high boiler pressure, remaining in contact with the goods for a considerable length of time and then passing away. This demands the construction of a steel case of sufficient strength to resist from fifty to sixty pounds of steam pressure, and the employment of two cylinders, one within the other, with a space between them for obtaining heat—an expensive and complicated system of construction. In the method of streaming-steam currents, the steam chamber required is far less in strength and weight, and consequent cost. Given a boiler pressure of from twenty to thirty pounds, the same efficiency in work can be had by streaming-steam as would be required under the old methods with a boiler pressure of fifty pounds with still steam.

At the instance of the Health Department of the city of New York, the writer designed and caused to be built at East Sixteenth street, New York City, the largest steam sterilization plant in this country, which has for two years demonstrated the fact that by employing streaming-steam currents the goods, bedding, clothing and everything that has been exposed to patients ill of infectious diseases can be perfectly sterilized in a shorter time and at much less cost for the equipment that would be required by the old methods.

The development of the art of sanitation as applied to the disposal of waste and the prevention of infectious diseases by disinfection during recent years has been rapid and substantial. A review of the field in the United States demonstrates how much has been accomplished by the efforts of sanitary associations and the individual example of a few earnest men, united to the practical business methods of others who have engaged in the work as a profession or avocation.

Who would have predicted ten years ago, when Mr. Andrew Engle exhibited at the meeting of the American Public Health Association in Milwaukee a small sheet-iron model of a furnace that actually burned garbage quickly and cleanly, that a hundred cities and towns would have since adopted that method of destroying their dangerous waste, and that another hundred would be seeking the latest improvement for effectually destroying it at the smallest cost consistent with protection from nuisance?

MEDICAL EXCERPT.

By T. P. Corbally, A. M., M. D.

Surgical Treatment of Circoceles.—M. Schwartz, of Paris, in a report to the Twelfth Surgical Congress ("Progrès Medical," December 31, 1898) states that he has operated upon more than a hundred cases of varicose veins by applying ligatures to the internal saphenous vein. The operation was successful in nearly all the cases. It is easily performed with the help of cocaine. Four catgut ligatures are placed at proper intervals on the vein. He always commences by ligating the saphenous vein at its opening at the triangle of Scarpa, in order to avoid the formation of a clot. In the case of swellings in the small serpentine veins, with cyanosis, the ligature is of no practical use, and should not be applied.

In case of large masses of varicose swellings M. Schwartz has found it more successful to remove loose portions of the surface and then effect an immediate reunion, an operation which forms a natural elastic tube (*bas élastique naturel*). In complications of these varicose enlargements the surgeon must use his best judgment as to the propriety of an operation. Ulcers generally heal after the application of the ligature. In two cases of *sciatique variqueuse* M. Schwartz stripped the sciatic nerve and removed all the small veins that surrounded it. Of his hundred operations M. Schwartz has since seen only fourteen. Not one of these has been followed by a relapse. In many of these, complicated with varicose ulcers, these ulcers were permanently cured.

The above report was followed by another to the same Congress by M. Rémy, of Paris, in which he has shown, by etiological and pathological investigation, that all varicose conditions cannot be operated upon successfully. In cases of transient varicose swellings, as those arising during pregnancy or those following phlegmasia, the cure must be left to nature. In ordinary varicose conditions the disease is the result of excessive strain or of fatigue resulting in exhaustion. Heredity has, in some cases, a very important influence on their production; in such cases there is a diminution of the usual number of valves in the veins, and this is a very important anatomical fact to be observed, because it always justifies the application of the ligatures which are intended to supply the absence of the necessary valves.

PALUDISM.—M. Laveran presented to the Académie de Medecine, in the name of MM. Kanellis and Cardimatis, of Athens ("Gazette Hebdomadaire," January 15, 1899), some special considerations on the mode of action of paludism. According to the authors of this communication, the different clinical forms of paludism are not produced by different pathogenic agents. The microbe of paludism is always the same, but its mode of development varies with the conditions existing in the element with which it is associated. The principal cause of the variable degree of intensity, in cases caused by the paludal virus, must be sought for in the organism in which it is developed; as fatigue, excesses of all kinds, alcoholism, etc., are causes predisposing to the disease which are recognized indirectly under the term pernicious.

MM. Kanellis and Cardimatis have shown that, besides these causes, the severity of the attack is in direct proportion to the number of parasites existing in the blood.

M. Laveran adds: "I have, independent of the investigations of these authors, arrived at the same conclusions, after much careful observation."

OYSTERS AND TYPHOID FEVER.—A circular issued lately by the physician in chief of the Municipality of Milan, advises the public to be on their guard against the danger of contracting typhoid fever from the use of oysters taken from places near the mouths of sewers, or those that may be placed there for preservation until needed. This circular has elicited from a certain Dr. Carrose a very violent article, published in the "Giornale di Agricoltura Moderna," under the title "The Legend of Typhoid Fever Caused by Oysters," in which the doctor accuses everybody of ignorance.

Professor Bordoni-Uffreduzzi has replied to him in a communication in the same journal, in which he reminds the reader of the very careful observations made by the most eminent bacteriologists of France, England, Germany, etc., showing that there is real danger in the use of oysters under such conditions, but that it may be removed by placing the suspected oysters, for several days, in sea water perfectly pure and removed from any possible communication from the refuse from sewers and from the foul water in most of the harbors or stations for shipping of all kinds. It will be remembered that this was also the conclusion sanctioned by the French Academy of Medicine in 1896, in the report of M. Cornil in reply to a very interesting communication from M. Chantemesse.—"Le Progrès Médical."

COLLYRIA OF IODIDE OF POTASSIUM.—The "Gazette Hebdomadaire" of January 1, 1899, gives an interesting communication, sent to the Société de Biologie by MM. Ulry and Frézals, as recorded in the archives of the Clinique d'Ophthalmologie. They have devoted much time to experimental inquiries as to the penetration into the eye of collyria of the aqueous solution of iodide of potassium.

We have undertaken, they say, some experiments to compare the respective quantities of the iodide of potassium that penetrates the globe of the eye, according as the substance is placed directly on the conjunctiva or taken into the system through the mouth.

They performed many experiments on rabbits, with the following results:

1. The iodide of potassium, placed on the conjunctiva in the form of an aqueous solution, penetrates into the aqueous humor.

2. It is found in the vitreous humor only when it enters through the general circulation, as shown by its presence in the urine.

3. When the quantity of the iodide given through the digestive organs is the same as the ordinary clinical dose of the iodine, the humors of the eye afford no evidence of its presence; the quantity that has penetrated the organ in such cases is inappreciable.

4. The simultaneous administration of the iodine through stomach and as a corylium allows a considerable quantity of the agent to penetrate into the anterior chamber.

PROTONUCLEIN IN THE TREATMENT OF ULCERS.—Dr. Louis Cohn, of New York, says (New York Polyclinic) that "It is a well known fact that of the regular clientele of a surgical dispensary patients suffering from some form of chronic ulceration constitute the greatest number." After referring to the common local treatment of such ulcerations and the uncertainty of benefit, he invites attention to the view of Dr. Wyeth, as given in his well-known standard text-book of surgery, "an ulcer is the result of molecular death in the integument of mucous membrane and the underlying areolar or submucous tissue. As molecular death is caused by a loss of nutrition in those parts, it looked to me as if protonuclein was the magic agent that could restore life by stimulating the leucocytes and thus vitalizing the parts affected. I determined to give it a fair trial and asked the manufacturers for a supply of their Protonuclein Special Powder for local use, and their Tablets for internal use, of which they kindly sent me a generous quantity." He then proceeds to cite in detail a number of

cases in which he used protonuclein, and concludes that "there is no doubt that in private practice, where the treatment can be applied oftener and patients are under better control, an acceleration of a cure can be brought about; but even under the severe strain of a dispensary test the results were so uniformly good that the use of protonuclein in all ulcerative processes was found to be an ideal measure."

VIN MARIANI IN EXHAUSTION.—We have had occasion ("St. Louis Medical and Surgical Journal," March, 1899) in numerous instances to administer "Vin Mariani" to business and professional men who complained of being gradually run down. The work of the office, the cares and worry entailed by business and the physical flaccidity brought on by overwork, all seemed to give way completely in a marvelously short space of time, despite the fact that the subjects continued uninterruptedly at their usual occupations. The notable fact to be observed is that in each instance the effect was permanent. But it must not be forgotten that, in order to make this result a lasting one, it is necessary to keep the patient upon a prolonged course in the use of "Vin Mariani." There is no doubt whatever that this preparation has proven itself a boon to mankind.

BROMIDIA IN THE TREATMENT OF EPILEPSY.—The "New Albany Medical Journal" for November, 1898, contains an article on "Epilepsy Treated by the Use of Bromidia," by T. Edward Converse, M. D., of Louisville, Ky., which, after discussing the use of medicines chiefly relied upon in the treatment of that disease, and giving the needful hygienic measures in considerable detail, concludes by referring to "the question often raised: How long will the patient have to keep up the treatment?" If the bromides are given they should be continued for at least two years after the last convulsion, or if combined with the chloral hydrate in the form of bromidia, a year and a half is sufficient in most cases. If the patient is having several attacks during the day, a teaspoonful of bromidia after the attack and repeated in an hour will abort the next attack; but, as a rule, one teaspoonful will be sufficient.

Nothing more is wanted to render man MISERABLE, than that he should fancy he is so.

THE NEWLY ELECTED EDITOR OF THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Dr. Joseph Eastman, of Indianapolis, trustee of the American Medical Association, contributes to the "Indiana Medical Journal" the following, under date of February 21, 1899:

"At the annual meeting of the board of trustees of the American Medical Association, held in Chicago, February 17, 1899, the candidates for the editorial chair made vacant by the death of Dr. John B. Hamilton were given a competitive examination and their merits and their indorsements thoroughly canvassel. This examination resulted in the election of Dr. George H. Simmons, of Lincoln, Neb., secretary of the State Medical Society, and editor of the 'Western Medical Review.'

"Dr. Simmons is not connected with any medical college. He is forty-six years of age. After passing through the common schools he studied at Tabor College, in Iowa. He graduated from the University of Nebraska during the time that Prof. A. R. Benton, of Indianapolis, was Chancellor of that institution. Professor Benton writes to one of the trustees: 'I have known Dr. Simmons from a boy. While in the university he was an earnest and capable student. His subsequent professional career has fully justified my expectations of him.' Dr. Simmons taught school in Lincoln, Neb., two years before he studied medicine. He also won a hundred-dollar prize for an essay, offered by the Kansas State Board of Agriculture. This proved an introduction to newspaper work, which furnished him the means of pursuing his medical studies. He graduated from Rush Medical College, and afterwards was two years in Europe, spending the time in Berlin, Vienna, Paris, Glasgow, Edinburgh and London. He has a love for editorial work, and made a special effort to study the means and method of conducting the London 'Lancet' and the 'Journal of the British Medical Association.' Mr. Ernest Hart favored him in his investigations. Returning to this country, he located in Lincoln, Neb. His ability as an organizer in his State and in the American Medical Association has been proven. His editorial ability was endorsed by letters from some of the best known American editors, notably one from Dr. Hobart A. Hare, of Philadelphia."

The above, kindly furnished by Dr. Eastman, fails to state that Dr. Simmons graduated from Hahnemann Medical College, Chicago, in 1882, and from Rush Medical College in 1892, ten years later. Polk's Directory, fourth edition, also attaches the degree of L. M., Dublin, to Dr. Simmons' record.

But by their fruits ye shall know them. That a physician of sufficient capacity and acumen to be elected to so trying and so honorable a position as the editor of the "American Medical Journal" should have made the transition from a pathy to the science of medicine, after due reflection and experience, is not a matter of wonder. Such has been the recent history of the more capable and intelligent of homeopathic graduates, particularly those locating in large cities and brought in contact with the great leaders and teachers. Without the fostering influence of the University of Michigan, homeopathy would doubtless have died a natural death in the West and the Chicago school of this faith never founded. The combination of a pathy with the study of medicine, which is purely a biological science, is a blot on the othewise fair pages of the University of Michigan, which is by law defined to be "a part of the public educational system of the State." It is no wonder that the governing board and the catalogue-makers of the University of Michigan do all in their power to keep the public obscured as to the mongrel medical character of their State university. Otherwise each of the pathies of the closing century would demand a special faculty to teach its chosen gospel. Osteopathy, eclecticism, hydrotherapy, Christian science, physio-medicalism and orificial surgery would each be justly claiming their four or five representatives in the medical faculty of the University of Michigan, and all mature and sane students, vexed with the babel and confusion of such a potpourri, would seek their medical education in schools of rational purpose and method.

But enough. Callow youths—lads under the enforced bondage of economy, tradition or propinquity—do attend and graduate from homeopathic schools. Later the scales fall from their eyes, and the more intelligent, aspiring and scientifically conscientious graduates complete their medical education in rational schools of theory and practice. So with the newly-elected editor of the "Journal of the American Medical Assciation." He was not elected editor because he had for several years worn the garb of a sectarian, but because of the sense, capacity and judgment which taught him that his cologne-water is not strengthened by shaking. his ink made blacker by adding water, or green-apple gripes cured

by eating green currants. The one thing that graces Dr. Simmons' connection with homeopathy is his prompt abandonment of it on the earliest opportunity.

The trustees have no doubt done the best they could. The editors they desired—men like Dr. Gould—they could not get. Another group of men hunted the position, but these the trustees wisely declined. A third group consisted of young and untried men; one of these the trustees selected, and Dr. Eastman has given us his professional pedigree. In any case, Dr. Simmons is now the editor of the American Association Journal, with its ten thousand readers, representing the bone and sinew of the profession of medicine in the United States—more particularly in the great Middle West, the dominating region of our country. He is aided by a score of the best medical writers in the country, who are now furnishing medical editorial essays on any topic they may select. The Journal will have a certain character and dignity with any editor, as it has abundant material and means, a forced subscription list, and a watchful board of trustees and abundant critics. The "New York Medical Record," the "New York Medical Journal" and the "Philadelphia Medical Journal" are its natural competitors. They have dealt very kindly with the very apparent weaknesses of the Association Journal in the past. Many of their subscribers are also subscribers to the Association Journal, and they naturally have refrained from harsh criticisms. If the Association simply needs a managing editor to hold its various departments and forces in proper alignment, the personality is not of very great importance, and new men may be selected from time to time. Indeed, there are many reasons for the appointment of an editorial committee to edit the Association Journal continuously, or from year to year, or until some commanding personality may be secured. After all, it is not of much importance who temporarily holds the torch of either journalism or civilization. The main thing is to keep the torch burning and pass it along. At present the divine flame is entrusted to the hands of Dr. Simmons, and every loyal friend of the American Medical Association will aid him to make the Journal the leading light of the profession, as it really ought to be.—"Indiana Medical Journal," March, 1899.

EDITOR'S TABLE.

SANITARIAN, APRIL, 1899.

☞All correspondence and exchanges, and all publications for review, should be addressed to the Editor, Dr. A. N. Bell, Brooklyn, N. Y.

NEW ORLEANS AND HAVANA.

"It is curious to note what a very slight difference exists between the climatic statistics of New Orleans and Havana," said a gentleman connected with the Weather Bureau service. "Of course the actual difference is enormous, but it resides in the humidity and other conditions not registered on the thermometer. Take, for instance, the summer temperature, during the months of June, July and August. In Havana the average, calculated from over twenty years, is 82 degrees. In New Orleans it is 81.6. In other words there is less than half a degree variation. The highest temperature on record in Havana is 100.6, and in New Orleans it is 99—again an astonishing parallel. For all the year around the difference is more marked, the average here being 68.2, against 76.8 at the Cuban capital. A comparison of the rainfall is another thing that would surprise the average person. There is a general impression that Cuba is simply deluged during a certain period of the year, but the truth is that the mean rainfall between May and October, which is the 'rainy season,' is only 32.3 inches, while ours is 27 inches. In our annual record we beat Havana considerably, having 60.5 inches of rain, as against 51.7 inches on the island. The most conspicuous contrast in the weather of the two cities is afforded by the winter temperature, which in Havana has never been known to fall below 49 degrees Fahrenheit. The changes down there are very sudden, however, and the mercury has been known to take a drop of 15 degrees in three hours in the middle of a day in July. The minimum was 74, but nevertheless everybody was shivering, and lots of folks got pneumonia and died."—"Times-Democrat," March 12, 1899.

To this summary of similarities should be added polluted soil without drainage or sewerage, respectively, and possessing the same general conditions for the maintenance of the viability of yellow fever germs. This unfortunate fact for New Orleans her

people persistently fail to recognize and have, as persistently hitherto, continued to tolerate for themselves the same local conditions as obtain in Havana—protesting the while that Havana and other similar localities abroad are her only sources of danger!

The civic authorities of New Orleans are now apparently aroused to an appreciation of their inconsistency. It is not the first time they have so appeared. Twenty years ago this writer was in conference with them with a view to the same purpose—drainage and sewerage—while they were smarting under the epidemic of the year before. But it was a flash in the pan: they couldn't afford it, and ere they could, a recurrence of the fever has again cost them more than twice what the work would have cost them twenty years ago, or would now. Possibly they will still wait and test the effect of sanitation of Havana, to which they are keenly alive, while they are purblind to their own condition.

EFFECTIVE QUARANTINE.

There can be none without cleanness—uncleanness is the post of danger at the port of arrival no less than at the port of departure.

The quarantine war in the Gulf States has already begun—March 15—for the current year. Every one of them claims for itself the only honest and truth-telling board of health; and, as may be seen by reference to another page (Mississippi, Mortality and Morbility Reports), some of them, the right of supervision of their neighbors, on the penalty of non-intercourse; while the cry of every one is "Clean up Cuba."

Well, Cuba is in process of being cleaned up on the *surface*—more effectually than some of the places in Louisiana and Mississippi, where yellow fever broke out last year, have ever been cleaned.

To turn up infected soil for sewerage, or for any other purpose, during hot weather is a well recognized danger in New Orleans, as in other localities; because disease germs are well known to *live*, if not indeed to multiply, outside of the living body, in congenial soil, as well as within it. When people generally recognize this fact, especially with reference to yellow fever, and act upon it, they will the better appreciate how and *when* they may safely proceed to deal with such germs. For it is an important fact with regard to yellow fever that there is no record of any case having been communicated in a temperature of or below 32 degrees

Fahrenheit. Under that temperature foul soil, or fomites of any kind may be safely dealt with. And for the same reason the quarantine of persons with yellow fever, or from yellow fever regions, at our northern ports in the winter time, is wholly unnecessary.

Congress having failed to pass the Caffery bill to elaborate the powers and duties of the Marine Hospital Service, or any other quarantine law, considering the action of the President in giving full control of the quarantine in Cuba and Puerto Rico to the Marine Hospital Service, there seems to be good ground for the inference that, in case of need, such obstruction to commerce and travel by the State and local authorities in our Southern States as occurred last year and the year before, he will also confer the control of quarantine in the Southern States on the Marine Hospital Service, for the exercise of which power the quarantine laws as they now obtain provide.

SMALLPOX.

In Alabama and Kentucky:

Office of the State Board of Health,
Bowling Green, Ky., Feb. 6, 1899.

To the Officials, Physicians and People of Kentucky:

Smallpox has been epidemic in the mining regions of Alabama for the past two years, and from this centre of infection, directly or indirectly, repeated serious and expensive outbreaks have occurred in Kentucky.

Recently about forty cases have developed in Louisville, one at Covington, one at Nicholasville and several suspicious cases are reported in a mining section in Ohio county. The disease also exists in Cincinnati, Indianapolis and St. Louis, which have constant railroad connection with many Kentucky towns. So far the disease has been almost exclusively confined to negroes, a large part of this race being unprotected by vaccination, but this exemption of whites cannot long be hoped for if it continues to spread, as nearly a third of the white people of this State are also unprotected.

Under these circumstances it is the duty of this board to warn our officials and people of the necessity of prompt action to prevent serious local outbreaks. Fortunately, the prevention of this disease is as certain and safe as it is cheap and easy. Vaccination and re-vaccination, properly done with reliable virus, is a sure preventive, and is entirely free from danger. It should always be done by a competent physician, with clean hands and instruments,

at three points, an inch apart, on a well cleaned arm; should be allowed to dry thoroughly before the sleeve is drawn down, and should be carefully protected from rubbing or other injury until the sore has entirely healed.

The board advises that each city and town at once pass and enforce a compulsory vaccination ordinance, beginning with the colored race, but reaching everybody; that an isolation hospital, and suitable grounds for its location, be secured in advance; that visiting and strange negroes be hunted out, vaccinated and kept under observation, and especially that physicians practising among negroes be advised as to the difficulty of recognizing mild cases of smallpox in this race, and of the importance of calling experienced counsel in every doubtful or suspicious case.

Had Madison, Bell, Knox, Whitley, Laurel and Jackson counties taken these precautions when advised to do so last year, thousands of dollars would have been saved in actual outlay, to say nothing of the far greater loss from interference with traffic and travel. Under our laws this expense must be met by the counties and cities affected, and it can only be avoided or made light by proper preparation before a case appears.

Quarantines against places infected with smallpox, the first resort of unprepared communities, do much harm in retarding the real work to be done, and, if rigidly enforced, are much more expensive than the simple precautions advised by sanitarians everywhere. No such quarantine can be established legally without the consent of this board, and this consent will not be given unless the circumstances are very exceptional.

Fresh and reliable virus may always be had from the Henry Drug Company, Louisville. Vaccination from the arm of a child known to be healthy is equally reliable.

This board holds itself in readiness to aid local boards to the full extent of its powers, but little outside aid will be needed if each community will intelligently prepare to take care of itself.

J. M. MATHEWS, M. D., President.
J. N. MCCORMACK, M. D., Secretary.

In Arkansas smallpox is reported to be increasingly prevalent, yet the schools continue as though there were no epidemic in the country, and the good citizens do not seem to realize the danger. Early in February a bill was passed by the legislature appropriating $5,000 to be used for the suppression of the epidemic. But in default of intelligent direction, President Dunnavant, of the State

Board of Health, is reported as having said (Little Rock "Democrat," February 15):

"We don't know what to do under that bill. We are as wholly at sea as before it was passed, and have been trying to get it construed in order that we may begin work under its provisions. It says that the fund is to be expended under the direction of the county boards of health, when, as a matter of fact, there are no such organizations in the State. And if there were, we do not know how to remunerate them. And again, there is no member of the State Board of Health who is willing to leave his practice and look after smallpox epidemics at $10 a day and actual expenses. I am not. In passing the bill the legislature seems to have been determined to do everything it could to minimize the beneficial enforcement of the measure, and bound it so with restrictions that it does not even provide for postage.

"In the meantime, however, we are doing all we can. In Fulton county the board appointed by us, with the co-operation of the people, is doing all in its power to stamp out the disease, which they can no longer deny is smallpox, in a virulent form. Up in Roland township, Pulaski county, we appointed a board, but we are informed that they are doing absolutely nothing to prevent the spread of the disease."

In California. Los Angeles, March 1: Three cases developed yesterday, two of which are certain to occasion more alarm than any of the others that have been discovered, one of them being a teacher in a public school who was taken ill while so engaged. "Her room in that school" was closed the day after, and ordered to be thoroughly fumigated before the children are allowed to re-enter it.

In Colorado. There have been 24 cases of smallpox in Denver alone during the winter (to February 27), and a number of other cases throughout the State, giving just cause for serious apprehension.

District of Columbia. Washington, March 2: The number of patients in the District smallpox hospital was increased yesterday afternoon to 31. March 7: To-day the startling discovery was made by the health office experts that a child attending the Randall school, First and I streets southwest, has been suffering from smallpox for the past several days. . . . The health officer at once directed that the school building be closed, and not only the room in which the sick child studied, but every other room in the building, be thoroughly disinfected, and every pupil vaccinated

failing to exhibit evidence of recent vaccination. The teachers and children attending the entire school building will be kept by the health officer under close observation, although it is not probable that they will be placed in quarantine.

The discovery of this case emphasizes, in Dr. Woodward's opinion, the importance and value of thorough vaccination of school children, and he is also of the opinion that the case as strongly emphasizes the importance and value of such instruction of teachers as will enable them to fully appreciate the absolute necessity of immediately reporting any and every case of suspicious illness among pupils.

In Louisiana, on February 2, there was reported from the Charity Hospital, New Orleans, a case of smallpox in the person of a steamboat roustabout. The patient was immediately removed to the Smallpox Hospital, the proper sanitary measures ordered to be carried out in the neighborhood frequented by him, and a report sent to the State Board. This case was followed by others in the persons also of negro steamboat roustabouts.

The infection was in most of these cases traceable to direct importation from sources outside this city, and all of the cases were confined to the same class of people.

There are now (March 7) at the Smallpox Hospital thirty-five patients, all of whom are negro laborers, and, while some cases have been severe, there has been no death.

In Maine there have been many cases. At Waterville (February 13) 42 cases are in quarantine. Colby College was closed. The faculty voted to take a two weeks' recess, when it is expected that all smallpox patients will be fully isolated. A like action was taken at Coburn Institute. The students are leaving by every train. The municipal officers have ordered the cancellation of all entertainments and gatherings of a public nature. The public schools are closed by order of the School Board. Vaccination is being vigorously urged by the State Board of Health.

In Ohio. Columbus, March 4: Serious outbreaks of smallpox were reported at the health office Friday. The first caused a scare in the City Hall. A colored man walked into the health office with a well-developed stage of the disease. He did not make Health Officer Hess feel any the better when he stated that there were seven more people living in the same house with him. A little later two children were reported stricken in another house, where there were twelve persons living.

In South Carolina Dr. James Evans, Chairman of Committee of

the State Board of Health, reports, for the year 1898, the number of cases of smallpox and expenses incurred on account of it, as follows: Orangeburg, $436; Columbia, 317 cases, $7,500; Sumter, $2,213.49; Pelham, 106 cases; Spartanburg, city and county, 355 cases, $2,722; Richland county, $1,004.04; Greenville, 57 cases, $3,000. The disease still continues at several places in the State.

In Texas. Tunis, February 28: The people of this city are very much excited over the smallpox scare. Several cases have been reported near here, but as yet no permanent case has been located. In Laredo there are said to be over 200 cases. Cases have been reported also in Dallas, Brenham, Georgetown, Baird, Bryan, Cleburne, Paris and Hearne.

Besides the above places where the disease is reported prevalent within the last two months, cases have been reported, more or less isolated, in many other places and in almost every State in the Union—admonishing the health authorities of neglected vaccination and needless expense.

A TYPICAL DIPHTHERIA NEST.

In the prompt search for the cause of a case of diphtheria in Keene, N. H., recently, an inspector for the Board of Health observed defective drainage of the kitchen sink. On opening the sink cupboard and removing some loose coverings he found the sink pipe to be carefully covered with what was apparently a piece of rubber boot leg secured in place by copious windings of twine or wire. This rubber had a felt lining and the whole bandage was found to be saturated with sewer or sink water.

On removing the boot leg a hole in the soil pipe was found several inches in length from which the sewage water and gases had evidently been escaping for a long time. The floor was wet and showed evidence of being frequently soaked. This break was below the trap and was so located as to at all times form a direct opening from the sewer main into the sink closet and thence into the room. On calling a plumber to remove the broken pipe, the connecting pipe was found to be honey-combed and entirely unfit for use for a considerable distance.

It was very evident that such sewage matter as would come from a sink had for a long time been oozing out upon the floor boards and timbers and saturating the piece of rubber boot and the felting upon it. The decomposition of this exuding matter was a source of constant foul air emanation predisposing to sickness. The symptoms in the case when the doctor was first called were simple sore throat, in no way alarming, and the parents did not note any

marked change for twenty-four hours or so. But it rapidly developed into a severe and finally fatal case of diphtheria that could not be overcome by the use of antitoxin, which was freeely administered.

The Board of Health has not ascertained, so far as reported, who the person was who thus undertook to mend a broken sewer pipe in a block filled with men, women and children by simply winding it with a rag. There were no other cases. Great credit is due to the health authorities in discovering and destroying the nest.

WANTED—A DUMP!

Dr. George I. Ott, Secretary of the Board of Health of Worcester, Mass., in his annual report for 1898, asks an appropriation of $350 for the re-establishment of a refuse dump. The report says:

"The town is in great need of a repository for waste. After the East street dump was abolished, land on Rigby street, belonging to the town, was appropriated to the purpose as a temporary expedient. This land is not properly situated for the purpose and has been nearly covered with refuse." The report further says that "the town has under consideration one or two pieces of land centrally located that will admirably fill the requirements of the public in this matter." In the centre of any such centrally located plot, in order to render it effective without danger to the public health, there should be constructed and operated a Morse-Boulger Refuse Destructor, as described in our March number, for Boston. Refuse dumps are pest-breeders and should not be tolerated by any community.

POISONOUS FOOD CANS.

The chemists of the State Board of Health of Missouri have published some rather startling facts with reference to the frauds of tin-plate trusts who are making fruit and other food cans with more lead than tin.

A recent number of the "Journal of Agriculture" attributes this fraud to "the fostering care of a prohibitive tariff that enables a reckless and soulless trust to manufacture and force upon the public a material that, when brought into contact with the acids of certain classes of food, produces an insidious and deadly poison. This poison manifests itself in the forms of various diseases, such as heart affection, paralysis, brain troubles, epilepsy, fevers of

different kinds and other fatal sicknesses that are often attributed to other causes, and which baffle the skill of the most learned practitioners. The insidious character of the material renders it all the more dangerous.

"Immediate steps should be taken to prevent this wholesale poisoning. Congress should remove the barriers against the importation of tin, and every State legislature should pass laws providing for the inspection of tin plate and canned goods, with ample powers on the part of inspectors to seize and destroy every sheet of lead or terne plate and every pound of food preserved in vessels made of such material. The powers conferred on inspectors should be ample, and their instructions direct and positive."

PERSONAL.

Dr. WILLIAM T. JENKINS has been appointed by Governor Roosevelt as a member of the State Board of Health. It has always been the custom to appoint the chairman of the Sanitary Committee of the New York City Board of Health a member of the State Board, and in appointing Dr. Jenkins the Governor followed this custom.

Dr. FREDERICK MONTIZAMBERT, of Quebec, for many years the efficient quarantine officer of the St. Lawrence—indeed the projector of the institution—has been relieved of his local charge and made Sanitary Advisor of the Dominion Government, with the title of "Director-General of Public Health," but is still general superintendent of quarantines and other duties, with his office at the capital, Ottawa.

Dr. GEORGE H. SIMMONS' election as editor of the "Journal of the American Medical Association" is referred to on another page.

MORTALITY AND MORBILITY REPORTS AND REVIEWS.

Correspondents under this head are particularly requested to be as prompt as possible.

NEW YORK, 6,789,313: Report for the year 1898, 120,972 deaths. This is 3,894 more than in 1897, which was a year of unusually low mortality, and is about the average of seven preceding years. The delayed returns, not reported in the Bulletin, numbered 733, making the death rate per thousand population 18.10, the average of the past ten years being 18.25. The death rate of the maritime district was 20.00 against 18.90 in 1897, there having been about 3,500 more deaths; of the other districts there is no material variance from the rate of last year. Last year the saving in mortality

was in the metropolis. The infant mortality (under five years) was greater by 2,300 than in 1897, though relatively decreased, constituting 30.2 per cent. of the total, against 32.5 last year, and an average of 33.5. The zymotic mortality constituted 13.6 per cent. of the total, against 14.0 last year and an average of 17.5. The decrease is confined to the urban communities, some of the rural districts showing a relative increase over last year. Among zymotic diseases there was an increase in the mortality from cerebro-spinal meningitis in all but the central districts; in typhoid fever in all parts of the State, including the metropolis, amounting to about 450 deaths; in whooping-cough by 300 deaths, the increase being limited to the eastern districts; and an increase (by 1,500) in diarrhœal mortality from last year, though not beyond the average. Diphtheria caused 2,620 deaths, the fewest of any year on record, being less by 1,500 than in 1897 and less than half the average yearly mortality from this cause. Consumption caused 13,000 deaths, which is with slight variation the mortality of every year. There were 2,500 deaths from grippe, which is less than the mortality of either of the eight preceding annual epidemics. Acute respiratory diseases had the average rate of mortality; that of other local diseases showed a moderate increase. The mean average temperature for the year was 48.5 degrees or 1 degree above the normal, and the total rainfall (average of State) 44.5 inches, or 4 inches above the normal.

January, 1899, 7,110,000: Total deaths, 12,421; under 5 years, 2,500; annual death rate per 1,000, 21.0; deaths from cerebro-spinal meningitis, 52; typhoid fever, 111; malarial diseases, 12; smallpox, 1; scarlet fever, 71; measles, 51; erysipelas, 43; whooping-cough, 77; diphtheria, 255; diarrhœal diseases, 127; acute respiratory diseases, 2,965; consumption, 1,304; puerperal diseases, 76; digestive system, 735; urinary system, 818; circulatory system, 1,116; nervous system, 1,386; cancer, 351; accident and violence, 400; old age, 917; unclassified, 1,153.

City of New York, 3,550,053, January, 1899: Total deaths, 5,741; under 5 years of age, 1,582; annual death rate per 1,000, 19.00; from cerebro-spinal meningitis, 21; typhoid fever, 23; malarial diseases, 6; smallpox, 1; scarlatina, 54; measles, 44; erysipelas, 30; whooping-cough, 39; diphtheria, 171; diarrhœal diseases, 40; acute respiratory diseases, 1,258; consumption, 769; puerperal diseases, 53; digestive system, 373; urinary system, 454; circulatory system, 418; nervous system, 545; cancer, 156; accident and violence, 217; old age, 109; unclassified, 960.

Inspection of telephones has been ordered. The telephones are cleaned with absorbent cotton to gather any lurking germs, and the cotton is placed in glass tubes and labeled. Experts are to isolate the different germs and determine whether they are of contagious and infectious diseases. If the investigation shows disease germs the telephone company will be required to regularly disinfect its telephones.

Recent inspection of tenement houses and tenement "factories" has discovered many "sweatshops" in both the boroughs of Manhattan and Brooklyn. In many of the apartments from three to seven people were manufacturing clothing for soldiers and civilians, and the clothing was used as bedding for the inmates. In several houses where clothing was being manufactured there was sickness.

Strict orders have been issued against bringing into the city any diseased cattle or other animals. All persons, corporations or companies bringing milch cows into the City of New York are required to furnish a certificate signed by a qualified veterinarian to the effect that said cows are free from tuberculosis as far as may be determined by physical examination and the tuberculin test.

Borough of Manhattan, 1,953,569, Jan., '99: Total deaths, 3,220; under 5 years, 923; annual death rate per 1,000, 19.4; from typhoid fever, 11; diphtheria, 92; phthisis, 387; acute respiratory diseases, 695.

Borough of the Bronx, 163,537, Jan., '99: Total deaths, 342; under 5 years, 76; annual death rate per 1,000, 24.6; from typhoid fever, 3; diphtheria, 5; phthisis, 106; acute respiratory diseases, 64.

Borough of Brooklyn, 1,231,548, Jan., '99: Total deaths, 1,832; under 5 years, 503; annual death rate per 1,000, 17.7; from typhoid fever, 8; diphtheria, 69; phthisis, 233; acute respiratory diseases, 409.

Borough of Queens, 134,139, Jan., '99: Total deaths, 218; under 5 years, 56; annual death rate per 1,000, 19.0; from typhoid fever, 1; diphtheria, 3; phthisis, 28; acute respiratory diseases, 53.

Borough of Richmond, 67,260, Jan., '99: Total deaths, 129; under 5 years, 24; annual death rate per 1,000, 225; from diphtheria, 2; phthisis, 15; acute respiratory diseases, 37.

Albany, 100,000, Jan., '99: Total deaths, 235; under 5 years, 58; annual death rate per 1,000, 28.0; from typhoid fever, 14; diphtheria, 5; phthisis, 28; acute respiratory diseases, 47.

Troy, 65,000, Jan., '99: Total deaths, 113; under 5 years, 18; annual death rate per 1,000, 21.0; from typhoid fever, 3; phthisis, 16; acute respiratory diseases, 28.

Utica, 55,000, Jan., '99: Total deaths, 95; under 5 years, 16; annual death rate per 1,000, 21.0; from diphtheria, 5; phthisis, 8; acute respiratory diseases, 26.

Syracuse, 120,000, Jan., '99: Total deaths, 161; under 5 years, 35; annual death rate per 1,000, 16.1; from typhoid fever, 3; diphtheria, 4; phthisis, 14; acute respiratory diseases, 44.

Buffalo, 360,000, Jan., '99: Total deaths, 444; under 5 years, 118; annual death rate per 1,000, 14.8; from typhoid fever, 4; diphtheria, 5; phthisis, 33; acute respiratory diseases, 110.

Rochester, 175,000, Jan., '99: Total deaths, 239; under 5 years, 41; annual death rate per 1,000, 16.4; from typhoid fever, 3; diphtheria, 8; phthisis, 25; acute respiratory diseases, 59.

Yonkers, 42,000, Jan., '99: Total deaths, 70; under 5 years, 19; annual death rate per 1,000, 21.0; from phthisis, 15; acute respiratory diseases, 20.

Cohoes, 24,000, Jan., '99: Total deaths, 62; under 5 years, 19; annual death rate per 1,000, 31.0; from typhoid fever, 5; phthisis, 9; acute respiratory diseases, 15.

Kingston, 25,500, Jan., '99: Total deaths, 44; under 5 years, 7; annual death rate per 1,000, 22.0; from phthisis, 6; acute respiratory diseases, 13.

Poughkeepsie, 25,000, Jan., '99: Total deaths, 61; under 5 years, 12; annual death rate per 1,000, 30.0; from typhoid fever, 1; phthisis, 8; acute respiratory diseases, 8.

Newburgh, 24,536, Jan., '99: Total deaths, 51; under 5 years, 5; annual death rate per 1,000, 23.5; from typhoid fever, 2; phthisis, 10; acute respiratory diseases, 18.

Schenectady, 27,000, Jan., '99: Total deaths, 50; under 5 years, 9; annual death rate per 1,000, 22.2; from phthisis, 5; acute respiratory diseases, 13.

Binghamton, 45,000, Jan., '99: Total deaths, 67; under 5 years, 6; annual death rate per 1,000, 18.0; from typhoid fever, 1; phthisis, 6; acute respiratory diseases, 8.

Elmira, 35,000, Jan., '99: Total deaths, 69; under 5 years, 13; annual death rate per 1,000, 24.0; from typhoid fever, 2; phthisis, 8; acute respiratory diseases, 23.

Oswego, 22,000, Jan., '99: Total deaths, 43; under 5 years, 8; annual death rate per 1,000, 23.5; from typhoid fever, 1; phthisis, 4; acute respiratory diseases, 13.

CALIFORNIA.—San Francisco, 360,000, Jan., '99: Total deaths, 657; under 5 years, 115; annual death rate per 1,000, 21.9; from typhoid fever, 8; diphtheria, 4; consumption, 58; acute respiratory diseases, 68.

COLORADO.—Denver, 167,000, Jan., '99: Total deaths, 297; under 5 years, 42; annual death rate per 1,000, 17.0; from typhoid fever, 1; phthisis, 62; acute respiratory diseases, 54.

Denver is suffering (February 16) from an epidemic of cerebral fever, more commonly known as spinal and cerebral meningitis. The number of cases is unknown because they are not reported to the city health department like scarlet fever and diphtheria.

The department's records show the existence of the disease only in the deaths reported. There have been 14 of these during the week just ended.

While a great many cases are among children of tender years, older persons are attacked. Two adults have died and four persons ranging in age from twelve to twenty years. The percentage of mortality is very large.

Meningitis first appeared last November in Denver to a degree greater than normal. It had been raging in Chicago during the autumn months of 1898, and there was an abnormal mortality from it in that city. There were a few more cases in Denver during December, but no deaths were reported from this cause. The January record showed that a few deaths had occurred, and the February record has displayed prominently the fact that people are confronted with a serious menace to life in this affection because it seems to be increasing at an alarming rate.

CONNECTICUT.—166 towns, 888,970, Jan., '99: Total deaths, 1,565; under 5 years, 257; annual death rate per 1,000, 21.1; from typhoid fever, 8; diphtheria, 24; phthisis, 119; acute respiratory diseases, 347.

New Haven, 112,000, Jan., '99: Total deaths, 179; under 5 years, 30; annual death rate per 1,000, 19.0; from typhoid fever, 1; diphtheria, 2; phthisis, 20; acute respiratory diseases, 31.

Hartford, 80,000, Jan., '99: Total deaths, 170; under 5 years, 37; annual death rate per 1,000, 23.8; from typhoid fever, 1; diphtheria, 3; phthisis, 12; acute respiratory diseases, 35.

Bridgeport, 65,000, Jan., '99: Total deaths, 120; under 5 years, 28; annual death rate per 1,000, 21.9; phthisis, 7; acute respiratory diseases, 18.

Waterbury, 45,000, Jan., '99: Total deaths, 89; under 5 years, 19; annual death rate per 1,000, 23.7; from phthisis, 5; acute respiratory diseases, 20.

DISTRICT OF COLUMBIA.—280,250, 4 weeks, Feb. 25, '99: Total deaths, 504; under 5 years, 146; annual death rate per 1,000, 23.3; from typhoid fever, 5; diphtheria, 22; phthisis, 66; acute respiratory diseases, 102.

ILLINOIS.—Chicago, 1,650,000, Jan., '99: Total deaths, 2,498; under 5 years, 731; annual death rate per 1,000, 14.2; from typhoid fever, 44; diphtheria, 82; phthisis, 237; acute respiratory diseases, 678.

INDIANA.—The Secretary reports that returns to the State Board of Health from sixty-six observers during the month of February indicate a slight decrease in area of prevalence compared with January of influenza, pneumonia, bronchitis, pleuritis, scarlet fever, diarrhœa and whooping-cough. The same reports show a slight increase in meningitis, inflammation of bowels, erysipelas, diphtheria and croup and intermittent fever.

IOWA.—Des Moines, 72,000, Jan., '99: Total deaths, 67; annual death rate per 1,000, 9.3; diphtheria, 1; phthisis, 2; acute respiratory diseases, 5.

Davenport, 36,000, Jan., '99: Total deaths, 67; annual death rate per 1,000, 18.6; from diphtheria, 1; phthisis, 10; acute respiratory diseases, 10.

LOUISIANA.—New Orleans, February 26: Dr. Charles A. Gaudet and Dr. Hampden S. Lewis, two of the three city members of the State Board of Health, yesterday sent their resignations to Governor Foster, to take effect at once. Both gentlemen, being asked the reason of their retirement from the board, said that they resigned because of their professional duties. The nature of the work of a member of the board was such as to interfere with their attention to their private practices, for which reason they had decided to resign. This leaves but one city member on the board at

present, President Souchon, with the four country members, Drs. Eagan, Randolph, Tarleton and Owen.

Preparatory to prompt and effective work for the present year, early in December last the State Board of Health selected by unanimous vote the following board of experts: Drs. Joseph Holt, F. Loeber, Rudolph Matas, E. S. Lewis, T. S. Kennedy, Lucien F. Salomon, F. W. Parham, "for diagnostic purposes exclusively, intended solely for the recognition of yellow fever in the city of New Orleans. . . . The expert functions of this board shall apply only to first cases."

February 23d Dr. Holt declined to accept, for a second time, for reasons that he had before explained. "Why," he said, "I could not accept any position associating me with the record of your board under its present administration, inasmuch as I could be of no possible benefit to the public welfare, dominated by the events of your history."

Evidently it is the purpose of this board to overcome the presumable reason of Dr. Holt's refusal to aid—the alleged neglect last year to *promptly report* first cases.

As a climax to that alleged neglect, there is now (March 15) pending a suit against both presidents, Dr. Souchon, of the State Board, and Dr. Kohnke, President of the City Board of Health, indicted for manslaughter by the grand jury of East Feliciana, "charged with the homicide of Mrs. Levi, in that they are charged to have concealed the existence of yellow fever in this city, with the alleged result that proper precautions to prevent contagion were not taken by the people outside this city, and that, therefore, Mrs. Levi got the yellow fever and died of it, her death being laid at the door of Drs. Souchon and Kohnke."

It has already been made to appear that Mrs. Levi did not die of yellow fever and it is doubtful whether she had recently been in New Orleans previous to her death. Altogether it is, of all the absurdities we have ever heard or read of embarrassing to health authorities, the most preposterous.

MARYLAND.—Baltimore, 506,398, Dec., '98: Total deaths, 955; under 5 years of age, 282; annual death rate per 1,000, 22.6; from typhoid fever, 8; diphtheria, 33; consumption, 78; acute respiratory diseases, 236.

MASSACHUSETTS.—Boston, 541,827, Jan., '99: Total deaths, 1,150; under 5 years of age, 297; annual death rate per 1,000,

25.4; from typhoid fever, 17; diphtheria, 20; consumption, 129; acute respiratory diseases, 351. Summary for the year 1898: Total deaths, 10,886; under 5 years of age, 3,577; death rate per 1,000, 20.0; from typhoid fever, 185; diphtheria, 170; consumption, 1,241; pneumonia, 1,169; bronchitis, 380; heart disease, 934; cholera infantum, 441; cancer, 412.

Rags.—Board of Health, Old Court House, Boston, March 1, 1899. At a meeting of the Board of Health this day the following regulation was passed: Whereas, it is a practice in this city to collect rags, old paper and other refuse material from dumping grounds, streets and other places, and to store, sort and otherwise handle the same within dwellings, and whereas, in the opinion of this board, such rags, old paper and other refuse material are a source of filth and capable of conveying infectious diseases from person to person, and of otherwise creating sickness, therefore ordered, that on and after March 1st instant no rags, old paper or other refuse material, gathered or recovered from any source, shall be brought into or allowed to remain within any building used as a dwelling. Attest: C. E. Davis, Jr., Secretary.

The board has also issued stringent orders prohibiting overhauling of the refuse put out from stores and houses to be collected by the sanitary division. It is the intention of the Board of Health, as a matter of health protection, to put a stop to the business. Hundreds of rag pickers gather from these refuse boxes and barrels material that has a market value, and, by carrying it into various tenements in the city, the liability to spread disease is great.

MICHIGAN.—2,184,967, Jan., '99: Total deaths, 3,241; under 5 years, 737; annual death rate per 1,000, 16.2; from typhoid fever, 29; diphtheria, 42; phthisis, 159; acute respiratory diseases, 402.

Detroit, 237,798, Jan., '99: Total deaths, 444; under 5 years, 136; annual death rate per 1,000 18.9; from typhoid fever, 7; diphtheria, 11; phthisis, 27; acute respiratory diseases, 49.

Coldwater, 5,286, 1898: Total deaths, 78; under 5 years, 17; death rate per 1,000, 14.7; from typhoid fever, 1; consumption, 6; acute respiratory diseases, 5.

MINNESOTA.—St. Paul, 215,582, Jan., '99: Total deaths, 148; under 5 years, 51; annual death rate per 1,000, 8.2; from typhoid fever, 2; diphtheria, 4; phthisis, 18; acute respiratory diseases, 32.

Minneapolis, 225,602, Jan., '99: Total deaths, 193; under 5 years, 51; annual death rate per 1,000, 9.2; from typhoid fever, 3; diphtheria, 5; phthisis, 22; acute respiratory diseases, 25.

MISSISSIPPI.—The State Board of Health has taken time by the forelock (February 4) by adopting a resolution "requiring the authorities of New Orleans to allow an inspection of the city by an inspector of the Mississippi board whenever such inspector demanded such a privilege" with reference to yellow fever.

MISSOURI.—St. Louis, 623,000, Jan., '99: Total deaths, 1,121; under 5 years, 312; annual death rate per 1,000, 21.4; from typhoid fever, 10; diphtheria, 15; phthisis, 107; acute respiratory diseases, 265.

Kansas City, 200,000, Jan., '99: Total deaths, 266; under 5 years, 64; annual death rate per 1,000, 15.9; from typhoid fever, 3; diphtheria, 3; phthisis, 10; acute respiratory diseases, 73.

"Embalmed Milk."—The Board of Health claims to have discovered that extensive adulteration of milk is being carried on by the addition of artificial butter fat to skim milk and a chemical preservative, the whole being then sold as pure milk. The preservative, on analysis, was found to be formaldehyde colored with a little aniline dye. Formaline is the name given to this peculiar preparation of wood alcohol, and it is the same thing that forms the basis for the embalming fluids used by undertakers in their business. If a sufficient quantity of the stuff is used milk will keep fresh for weeks, and the fluid is actually embalmed as is a body treated with the same fluid. The objections to the use of this material is that it destroys the ferments of digestion, which alone make milk nutritive, and so prevents the milk from being properly assimilated by its users. Moreover, if persisted in, it not only destroys digestion, but is poisonous.

NEW JERSEY.—Newark, 235,000, 4 weeks, February 25, '99: Total deaths, 369; under 5 years, 166; annual death rate per 1,000, 19.9; from diphtheria, 8; phthisis, 55; acute respiratory diseases, 50.

Paterson, 114,328, Jan., '99: Total deaths, 191; under 5 years, 52; annual death rate per 1,000, 16.7; from typhoid fever, 6; diphtheria, 9; phthisis, 23; acute respiratory diseases, 15.

February 28: Fourteen cases of typhoid fever were reported to the Board of Health yesterday. Coming, as they did, altogether,

and after a long spell of comparative immunity from the disease, the health authorities were surprised and puzzled. The Board of Health had received no reports of cases of typhoid from February 1 to 17, and only four from February 17 until yesterday. Previous to February 1 the number of cases reported was about the same as usual when there is no outbreak in the city.

NORTH CAROLINA.—A well merited compliment (Bangor, Me., "Commercial"):

No narrow idea of its field of work is entertained by the State Board of Health in North Carolina. It does not confine itself to building legal cordons around plague spots, or to giving good advice in health bulletins which nobody reads, but it uses a large portion of its annual appropriation in direct teaching of the people. Possibly local conditions of a large proportion of illiterate negro inhabitants suggested the plan, but it is undoubtedly a good one. "Health conferences with the people," as the board calls them, are held frequently in different parts of the State. All in the vicinity are invited to attend, and special efforts are made to secure the presence of the women, who are regarded as the health officers of the family. At these conferences papers, adapted in language to the hearers, are read on questions of disease and sanitation. Unclean premises, impure water, germ-laden milk, and the simple principles of physiology and hygiene are discussed before these audiences by the best physicians of the State.

OHIO.—Cleveland, 395,000, Jan., '99: Total deaths, 611; under 5 years, 174; annual death rate per 1,000, 18.5; from typhoid fever, 11; diphtheria, 13; phthisis, 24; acute respiratory diseases, 107.

PENNSYLVANIA.—Philadelphia, 1,266,832, 4 weeks, Feb. 25, '99: Total deaths, 2,257; under 5 years, 597; annual death rate per 1,000, 24.4; from typhoid fever, 155; diphtheria, 84; phthisis, 227; acute respiratory diseases, 416.

March 1: Mr. Charles H. Heustis was appointed Health Officer of Philadelphia by Governor Stone yesterday, to succeed Dr. Lee, relieved. Mr. Heustis' reputation is that of a successful and popular newspaper editor.

March 8: The typhoid fever epidemic assumed proportions to-day that made even the passive attaches in the offices of the Board of Health stand aghast. Between noon yesterday and noon to-day 71 new cases and three deaths were reported. This is a greater number of typhoid fever cases than has ever been re-

ported in twenty-four hours in the previous history of the city and about 30 per cent. greater than the daily average since the epidemic became alarming.

There have been 8,386 cases of the disease reported since Jan. 1 and 359 deaths.

The Water Situation.—Dr. Lee said after the meeting: "To pump polluted and poisonous water into our homes, as has been done for weeks, spreading disease and death, is nothing short of a crime."

"The situation is such," said Chief Trautwine, of the Bureau of Water, "that if the Schuylkill was completely a sewer, as it now partly is, we should be compelled to pump the flow into our reservoirs and then into the homes."

"Why then do we not have our water filtered? We have known of this condition for years and have been talking about it almost continuously. The Board of Health is not to blame, though it would be justified at the present time in closing the water works as a nuisance dangerous to the public health. The fault lies with councils—primarily with the corrupt members of Councils who are in the pay of speculators or who hope to make something for themselves out of the public distress; but as these councilmen have all been re-elected by approving majorities of their fellow-citizens they no doubt feel that they have been 'vindicated' and given fresh warrant to trade upon the health of the community." —"Ledger."

Pittsburg, 305,000, 4 weeks, Feb. 25, '99: Total deaths, 513; under 5 years, 168; annual death rate per 1,000, 20.7; from typhoid fever, 24; diphtheria, 2; phthisis, 35; acute respiratory diseases, 112.

South Carolina.—Charleston, 65,165, 4 weeks, Feb. 25, '99: Total deaths, 116; under 5 years, 33; annual death rate per 1,000, 22.8; from phthisis, 8; acute respiratory diseases, 16.

Washington.—Seattle, 70,000, Jan., '99: Total deaths, 58; under 5 years, 13; annual death rate per 1,000, 9.2; from typhoid fever, 2; diphtheria, 6; phthisis, 6; acute respiratory diseases, 11.

Wisconsin.—Milwaukee, 280,000, Jan., '99: Total deaths, 432; under 5 years, 147; annual death rate per 1,000, 18.2; from typhoid fever, 2; diphtheria, 16; phthisis, 48; acute respiratory diseases, 83.

DEATHS IN THE ARMY.—Washington, March 10.—The following statement has been issued, showing the total number of deaths reported to the Adjutant General's office between May 1, 1898, and Feb. 28, 1899: Killed in action, 329; died of wounds, 125; died of disease, 5,277; total, 5,731.

MORTALITY STATISTICS ABROAD FOR THE YEAR 1898.—Population; total mortality; annual death rate per 1,000; deaths from smallpox; measles; scarlatina; typhoid fever; diphtheria; whooping-cough; diarrhœal diseases; pneumonia; phthisis:

London, 4,504,766; 83,919; 18.9; 1; 3,071; 583; 598; 1,818; 2,161; 6,977; (?); 7,940. Glasgow, 724,349; 15,333; 21.1; 0; 528; 187; 236; 159; 706; 840; 3,080; (?). Liverpool, 633,645; 15,055; 23.7; 2; 276; 143; 166; 147; 329; 965; (?); (?). Manchester, 539,079; 11,770; 21.8; 0; 270; 64; 122; 50; 171; 975; (?); (?). Birmingham, 510,343; 10,179; 19.8; 0; 181; 46; 114; 131; 251; 695; (?); (?). Leeds, 416,618; 7,982; 19.2; 2; 171; 118; 92; 224; 160; 507; (?); (?). Sheffield, 356,478; 7,197; 20.1; 0; 175; 56; 142; 93; 219; 672; (?); (?). Dublin, 349,594; 9,330; 26.6; 0; 9; 87; 188; 89; 154; 425; 1,657; 1,198. Bristol, 316,900; 5,435; 17.1; 0; 307; 14; 25; 44; 114; 346; (?); (?). Belfast, 304,610; 7,768; 25.4; 0; 54; 21; 663; 87; 109; 356; 1,658; 1,044. Edinburgh, 295,628; 5,794; 19.5; 0; 141; 86; 40; 67; 126; 251; 954; 557. Nottingham, 236,137; 4,170; 17.6; 0; 104; 34; 56; 24; 58; 282; (?); (?). Bradford, 233,737; 4,100; 17.5; 0; 104; 11; 49; 17; 68; 244; (?); (?). Hull, 229,887; 4,209; 18.3; 0; 92; 28; 54; 17; 68; 423; (?); (?). Newcastle, 223,021; 4,764; 21.3; 3; 126; 25; 66; 31; 139; 244; (?); (?). Salford, 215,702; 4,894; 22.6; 99; 62; 80; 32; 129; 462; (?); (?). Leicester, 208,662; 3,551; 17.0; 0; 214; 44; 30; 62; 19; 328; (?); (?). Portsmouth, 186,618; 3,033; 16.2; 0; 69; 32; 43; 55; 43; 160; (?); (?). Cardiff, 177,770; 2,627; 14.8; 0; 50; 8; 17; 130; 44; 148; (?); (?). Brighton, 122,310; 2,062; 14.8; 0; 82; 7; 18; 21; 21; 139; (?); (?). Norwich, 111,669; 2,112; 18.9; 0; 75; 23; 45; 14; 37; 168; (?); (?). Plymouth, 99,136; 1,932; 19.4; 0; 70; 4; 6; 10; 29; 94; (?); (?). Amsterdam, 503,045; 8,463; 16.7; 0; 144; 9; 52; 72; 177; 950; 1,549; 907. Rotterdam, 298,433; 5,645; 18.9; 0; 110; 9; 55; 54; 139; (?); (?); (?). La Haye, 196,325; 3,360; 17.1; 1; 38; 5; 8; 32; 76; (?); (?); (?). Paris, 2,511,629; 49,419; 19.8; 5; 865; 117 251; 256; 390; 3,579; 6,143; 9,575.

Lyons, 466,028; 9,403; 20.2; 0; 44; 13; 136; 45; 31; 503; 1,776; 1,219. Bordeaux, 256,906; 5,381; 21.0; 2; 51; 8; 41; 35; 45; 349; 669; 487. Lille, 219,529; 5,145; 23.4; 1; 167; 4; 26; 37; 49; 1,017; 694; 727. Saint Etienne, 135,784; 2,990; 22.0; 0; 19; 5; 43; 33; 7; 225; 483; 364. Nantes, 125,757; 2,606; 20.7; 1; 1; 2; 48; 11; 13; 218; 259; 485. Roubaix, 124,447; 2,456; 17.7; 0; 88; 1; 18; 15; 28; 491; 413; 318. Havre, 119,470; 3,425; 28.7; 0; 142; 1; 46; 10; 29; 543; 392; 573. Rouen, 114,817; 3,221; 28.0; 0; 3; 2; 31; 18; 5; 563; 359; 526. Nice, 114,121; 2,375; 20.8; 0; 0; 0; 153; 14; 5; 228; 376; 256. Rheims, 107,709; 2,762; 25.6; 0; 106; 1; 45; 16; 49; 443; 281; 314. Berlin, 1,728,201; 29,795; 17.1; 0; 259; 265; 94; 645; 512; 3,800; 2,676; 3,820. Hamburg, 661,015; 11,656; 17.5; 0; 243; 30; 30; 100; 217; 1,036; 1,402; 1,202. Munich, 430,000; 10,760; 25.0; 0; 66; 57; 13; 180; 126; 2,408; 1,058; 1,334. Leipsic, 422,097; 8,136; 19.3; 0; 83; 30; 31; 124; (?); 1,655; 832; 889. Breslau, 392,795; 9,710; 24.8; 0; 100; 91; 26; 92; 117; 1,427; 1,194; 1,290. Dresden, 377,500; 7,145; 18.9; 0; 98; 22; 17; 86; 81; 831; 829; 902. Cologne, 340,000; 7,795; 23.0; 0; 204; 10; 41; 163; 147; 1,344; 740; 723. Frankfort on Main, 244,808; 3,841; 15.6; 0; 20; 7; 4; 23; (?); 408; 468; 612. Hanover, 227,660; 3,864; 16.9; 0; 4; 9; 12; 34; (?); 475; 491; 366. Magdeburg, 220,722; 4,789; 21.7; 0; 113; 47; 7; 85; (?); 877; 582; 440. Dusseldorf, 192,518; 3,795; 19.6; 0; 11; 32; 9; 58; (?); 614; 464; 350. Nuremberg, 172,941; 4,263; 24.6; 0; 0; 32; 15; 49; (?); 792; 532; 757; Chemnitz, 172,417; 4,158; 24.1; 0; 15; 11; 9; 84; (?); 118; 174; 366. Altona, 161,886; 2,755; 17.0; 0; 51; 3; 4; 17; (?); 269; 362; 299. Charlottenburg, 161,062; 2,361; 18.6; 0; 8; 30; 7; 70; (?); 299; 281; 228. Stettin, 154,233; 3,561; 23.1; 0; 27; 41; 32; 58; (?); 778; 280; 304. Stuttgart, 149,943; 2,590; 17.3; 0; 39; 13; 5; 49; (?); 295; 315; 280. Elberfeld, 146,281; 2,436; 16.6; 0; 9; 5; 9; 37; (?); 370; 337; 275. Strasburg, 142,885; 3,106; 21.7; 0; 92; 4; 15; 75; (?); 661; 457; 318. Barmen, 132,598; 2,445; 18.5; 0; 66; 31; 13; 34; (?); 420; 401; 283. Aix la Chapelle, 131,364; 2,596; 19.7; 0; 0; 2; 7; 21; (?); 676; 329; 208. Dantzig, 128,325; 2,940; 22.9; 0; 6; 2; 12; 79; (?); 448; 295; 285. Halle, 123,755; 2,914; 23.5; 0; 11; 188; 23; 67; (?); 414; 337; 214. Brunswick, 122,718; 2,203; 17.9; 0; 16; 1; 11; 25; (?); 352; 257; 258. Crefeld, 108,211; 2,014; 18.6; 0; 24; 37; 8; 47; (?); 284; 247; 209. Essen, 105,582; 2,341; 18.2; 0; 23; 56; 12; 36; (?); 360; 507; 267. Mannheim, 104,182; 2,139; 20.5;

0; 0; 5; 10; 21; (?); 371; 297; 269. Zurich, 158,504; 2,474; 15.6; 0; 17; 4; 29; 39; 23; 408; 207; 340. Vienna, 1,574,129; 32,036; 20.0; 0; 793; 224; 94; 507; 120; 3,555; 5,269; 5,507. Buda-Pesth, 648,104; 14,262; 22.1; 1; 313; 229; 164; 193; 44; 1,496; 2,032; 2,275. Prague, 377,109; 7,206; 19.1; 0; 195; 202; 85; 107; 8; 361; 738; 1,177. Trieste, 164,491; 4,642; 28.2; 0; 12; 101; 61; 84; 23; 572; 749; 650. Gratz, 122,350; 3,216; 26.3; (?); (?); (?); (?); (?); (?); (?); (?); (?). Brünn, 102,509; 2,617; 25.5; 3; 29; 75; 15; 27; 20; (?); 265; 559. Brussels, 551,-011; 9,227; 16.7; 2; 77; 26; 90; 30; 89; (?); 1,342; 1,063. Copenhagen, 340,500; 6,150; 18.0; 0; 31; 44; 34; 83; 220; 347; 582; 857. Stockholm, 274,611; 4,899; 17.9; 0; 38; 41; 22; 191; 82; 346; 901; 677. Gothemburg, 117,350; 1,765; 15.1; 2; 30; 9; 15; 19; 16; 109; 171; 343. Christiania, 203,324; 3,403; 16.8; 4; 60; 19; 14; 28; 48; 208; 573; 590. Helsingfors, 79,454; 1,417; 17.8; 0; 92; 10; 5; 10; 10; 207; 242; 221. St. Petersburg, 1,132,677; 29,175; 25.5; 89; 401; 636; 1,214; 1,255; 295; 3,320; 1,060; 4,024. Moscow, 988,614; 29,530; 29.5; 145; 427; 436; 432; 701; 146; 5,763; 640; 3,444. Varsovie, 601,408; 13,966; 23.0; 313; 382; 993; 130; 264; 87; 1,940; 2,645; 1,317. Odessa, 383,000; 8,385; 21.0; 42; 103; 92; 142; 136; 75; 1,166; (?); 878. Rome, 489,965; 8,991; 18.4; 3; 130; 4; 172; 48; 30; 837; 1,625; 776. Turin, 353,424; 6,046; 17.1; 0; 70; 3; 91; 53; 55; 522; 789; 696. Palerme, 278,972; 6,699; 23.3; 1; 87; 35; 214; 97; 31; 1,077; 1,194; 466. Venice, 167,074; 3,540; 21.1; 0; 5; 2; 87; 58; 35; 379; 625; 344. Livourne, 104,536; 1,987; 19.0; 1; 0; 2; 104; 21; 0; 155; 299; 217.

For the third quarter, 1898: Oporto, 171,467; 1,300; 30.3; 19; (?); (?); 37; 13; (?); (?); 369; 68; 130.

For the fourth quarter, 1898: Rouen, 114,817; 642; 22.3; 0; 1; 0; 7; 3; 3; 89; 64; 108. Nice, 114,121; 644; 22.5; 0; 0; 0; 95; 3; 1; 65; 77; 60. Besançon, 58,010; 242; 16.7; 0; 0; 0; 0; 5; 0; 6; 24; 37. Breslau, 392,795; 2,155; 22.0; 0; 2; 38; 8; 27; 34; 226; 247; 278; Rome, 489,965; 2,226; 18.2; 2; 4; 0; 77; 16; 12; 227; 258; 198. Turin, 353,424; 1,321; 14.9; 0; 0; 1; 38; 19; 15; 117; 117; 152.

BOOK REVIEWS.

EXAMINATION OF WATER (Chemical and Bacteriological).—By WILLIAM P. MASON, Professor of Chemistry, Rensselaer Polytechnic Institute; Member of the American Philosophical Society, the American Chemical Society, the American Public Health Association, the American Water Works Association, the New England Water Works Association, the Franklin Institute, etc., etc. First thousand. v x 135 pages. 12m. Cloth, $1.25. Order through your bookseller, or copies will be forwarded postpaid by the publishers on the receipt of the retail price. New York: John Wiley & Sons. London: Chapman & Hall, Limited.

An admirably lucid book compared with most books on the subject. It assumes, however, knowledge of ordinary quantitative analysis, and therefore comprehends the merest suggestions only for the determination of the presence of mineral matters in a water, while the items properly lying within the scope of a sanitary determination are dealt with more at length and greater precision. And so, too, upon the bacteriological aspect: leaving the great field of research and ultimate differentiation of research, only so much is comprehended as has been demonstrated to be of sanitary significance.

It is divided into three chapters: Introductory—Popular misconception as to the character of water analysis; a knowledge of the source of the sample necessary to proper interpretation of analytical results. Chemical Examination of Water—Directions for sampling; method of stating analytical results; special laboratory required; turbidity; odor; taste; temperature; reaction; color; total solids; loss on ignition; hardness, chlorine; nitrites; nitrates; organic matter; free ammonia; albuminoid ammonia; "required oxygen;" lead; copper; iron, zinc; arsenic; chromium; alum; phosphates; analysis of mineral residue; dissolved gases; conversion of "parts per million" into grains per U. S. gallon. Bacteriological Examination of Water—Preparation of media; bouillon; nutrient gelatin; sugar bouillon; sugar gelatin; agar-agar; sterilizing; sampling; sowing media; incubating; counting colonies; gas-forming bacteria; tests for bacillus coli communis; difficulty of detecting bacillus typhosis; diagnostic value of the "colon group;" as to bacterial index of fæcal pollution; great cold not fatal to bacteria; enumeration of organisms not bacterial.

ANNUAL ADDRESSES OF THE PRESIDENT OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA—1894, '95, '96, '97, '98.—By SAMUEL C. BUSEY, M.D., LL.D., President of the Medical Society of the District of Columbia, 1877, 1894-'99; Member of the Philosophical and Anthropological Societies of Washington, of the Washington Academy of Sciences, and of the Columbia Historical Society; Author of "Personal Reminiscences," "A Souvenir," "Picture of the City of Washington in the Past," etc. 8vo, pp. 186, and Four Maps. Washington, D. C., 1899.

"These addresses," the author tells us, in a brief introduction, "set forth and emphasize the advance of the Society along the line of scientific medicine and its activity in the promotion of State medicine and public hygiene." But they are much more than this: they comprehend an account of the evolution of a beautiful and healthful city, with maps showing the steps of progress, from what would now be considered one of the most unpromising sites. And, considering the author's thorough familiarity with the history of the city from the beginning, together with his half century's actual observation of practical interest and actual participation in the promotion of the evolution, the addresses as a whole are commendable not only to the medical profession and practical sanitarians, but to all who would make themselves familiar with the history and development of one of the most beautiful cities in the world, and the means by which it has been made so.

CONTEMPORARY LITERATURE.

DIET IN HEALTH.

In health, as a rule, to live generously is to live wisely. A dish which includes a variety of fairly digestible articles of food supplies a reserve fund which enables the system to meet emergencies, and to avoid the possibility of "physiological bankruptcy." Hippocrates observes that "a very slender and restricted diet is dangerous to persons in health, because they bear transgressions of it with more difficulty." A sound digestion seems to possess, within certain limits, a capacity for adapting itself to circumstances—at any rate, for the time being. When taxed beyond endurance, like "the whirligig of time," it "works its revenges."

A healthy appetite craves and digests the food material which the system requires. If we know that in infancy milk is essential

to the human organism, because before the age of six months, or thereabouts the "physiological machinery" is not prepared for the digestion of starchy foods; that in childhood sugar and starch and fat are required to supply the elements especially needed for growth; that in youth bread and meat in abundance are necessary to meet the increasing demands which development imposes on the constitution; that in mature life, when the brain is most exercised, digestible phosphatic salts are needed to repair wasted tissue; that in old age less food is required, and bread, as the nonogenarian Sir Isaac Holden asserted, renders the arteries "like furred boilers"—if we find, in brief, that every period and condition of life has certain exigencies in which reason must take instinct for her guide—we should listen to the voice of instinct, realizing that the appetite is subject to a "law of its own." This law does not involve the fallacy that instinct is not to be trained or disciplined; it only requires that the function of instinct be given due recognition. In the words of Shakespeare, we should let "good digestion wait on appetite, and health on both."—"Harpers' Bazar."

SCIENCE IN EDUCATION.

When the history of education during the nineteenth century comes to be written, one of its most striking features will be presented by the rise and growth of science in the general educational arrangements of every civilized country. At the beginning of the century our schools and colleges were still following, with comparatively little change, the methods and subjects of tuition that had been in use from the time of the middle ages. But the extraordinary development of the physical and natural sciences, which has done so much to alter the ordinary conditions of life, has powerfully affected also our system of public instruction. The mediæval circle of studies has been widely recognized not to supply all the mental training needed in the ampler range of modern requirement. Science has, step by step, gained a footing in the strongholds of the older learning. Not without vehement struggle, however, has she been able to intrench herself there. Even now, although her ultimate victory is assured, the warfare is by no means at an end.—From "Science in Education," by Sir Archibald Geikie, in "Appletons' Popular Science Monthly" for March.

HEROES OF THE RAILWAY.

Deeds of Daring that the Men Themselves Sometimes Forget.

The "Century" has published several articles on the Heroes of Peace, and one of the best of the series appears in the March number of the magazine. It is called "Heroes of the Railway Service," and consist of notes from the experience of Mr. Charles De Lano Hine. In the late war he was a major in the First District of Columbia Volunteer Infantry. Here is one of the good stories he tells:

Not long ago a freight conductor started on a night run after drawing his month's wages from the pay-car. He had with him his young son, a lad of twelve, and when well under way they began to cook supper on the caboose stove. The rear brakeman, on watch in the cupola, observed that the engine seemed to have unusual difficulty in pulling the train. He did not connect this fact with the presence of several hoboes on top of the cars, who, unknown to him, were setting brakes and stalling the train. The front door of the caboose flew open, and four masked and armed men ordered the occupants to throw up their hands. The conductor jumped to shield his child, seized a coupling-pin and smashed a head, but not until four shots had rung out and three bullets were in his body. Fighting to the last, he fell dead in the doorway. The brakeman was shot in the arm, and made his escape from the car to the ground. Fearing he would give the alarm and cause their capture, the bandits fled. Then the boy showed that the blood of heroes is transmitted to succeeding generations. He pulled the body of his father inside, and coolly secured his money and watch. He noticed that the train was barely moving, and it occurred to him that there was a second section close behind. He knew the brakeman had no lantern, even if alive. The plucky boy took the red light and torpedoes, dropped off, ran back, expecting at every step to be shot, and flagged the other train. Travelers westward over the Big Four sometimes wonder why a slender volunteer seems so prominent in helping the switchman attach the dining-car at one of the terminals. If they happen to inquire, the men reply: "Why, that's John's boy, the conductor those bums 'put in the clear' that pay-day last year."

Other striking tales of heroism on the railroad are told by Mr. Gustave Kobbé.

HOW SAILORS ARE MADE.

Every boy who reads ST. NICHOLAS for March will pay special attention to the article on "Apprentices of the United States Navy," by Joseph C. Groff. Many are the ways and means employed for the proper training of our seamen, and it is only after many years of hard work that good results can be expected. The Government, fully realizing this necessity, about the time that the modern vessels came into use organized the apprentice training system for American boys who might wish to become modern man-of-war's-men.

Headquarters for the apprentices have always been at Newport, Rhode Island, and there the boys are sent from different parts of the country to receive their first lessons fitting them to be able seamen. There one of the largest old-time sailing vessels of the navy is fitted up as a receiving ship for them, and aboard of it they are all quartered. The old "Constellation," sister ship to the "Constitution" ("Old Ironsides"), is now in use for this purpose.

Boys who are enlisted on receiving ships at the several naval stations are sent on to Newport to begin their work at once. There are usually at the station about three hundred undergoing instruction at the same time. Any American youth between the ages of fourteen and seventeen, who has the consent of parents or guardian, who can read and write the English language, and who is possessed of a sound physique, will find no difficulty in being enrolled in the navy as an apprentice. . . . When a boy first enters the navy he receives as pay nine dollars a month, besides his rations, and he is also provided free with a complete outfit of bedding and clothing. . . .

Such apprentices are taught the details of guns, explosives, projectiles, electricity, signaling, and all the important duties of a modern sailor. They are given several months of practical work with all the modern armament used in the service, they being sent on short practice cruises aboard of either a battleship or a double-turreted monitor, on which are guns of every description, from a small machine-gun to the large twelve-inch gun mounted in a turret.

As soon as one detail of apprentices has been put through the required course, it is relieved and another is sent to take its place; so in this way there is always good timber from which to draw competent gun-captains and electricians.

THE CLIMATE OF PUERTO RICO.

Yellow fever need hardly be dreaded in Puerto Rico. It has never taken the form of an epidemic, and but few cases are reported from year to year. It has made itself more apparent, perhaps, in the barracks of the Spanish soldiers and in the prisons than elsewhere. It has been confined mainly to the coast towns, and is not heard of in the interior towns of high altitude. It is well to remember, however, that yellow fever is a disease of night, and that by taking the precaution of not going out until after the sun is well up in the morning, and being in the house when the shades of evening fall, and living in upper-story rooms if possible, one runs little risk of being smitten by this dread disease. Yet no rule holds good during an epidemic, and avoidance of the fever-infected districts is the only safe recourse. Always keep away from sections of a coast town in the tropics where the poor, degraded and vicious live; keep the person clean, change the clothing often and live among cleanly surroundings.

On the whole, Puerto Rico has the most salubrious climate and engenders the smallest number of physical ailments among the unacclimated of all the regions of the Western Hemisphere within the torrid zone. In any country where vegetation grows rank and luxuriant, where the suns are hot and the rainfalls frequent, disease is necessarily more prevalent, but Puerto Rico has been remarkably free from the scourges which afflict the people of adjacent isles; moreover, it should be remembered, in summing up the situation, that this fair condition exists on an island where the population is, and has been for centuries, more dense than that of almost any other purely agricultural section of the New World. —"Harper's Weekly."

THE NORTH AMERICAN REVIEW for March contains the first portion of an exceedingly interesting paper on "British Rule in India" from the pen of the Rev. J. P. Jones, D. D., missionary of the American Board at Madura, South India. Dr. Jones, who is an American citizen, has spent the last two decades amid the Hindu people, and has studied with keen interest England's work in India.

"Christian Science and Its Legal Aspects" form the subject of a trenchant article by William A. Purrington. Mr. Purrington enters elaborately into his subject, illustrating the difficulty and possibilities of dealing with religious fanatics through existing laws, when wrong theory is reduced to harmful practice.

Andrew Carnegie furnishes a second contribution on "Americanism versus Imperialism." Mr. Carnegie is as determined a foe as ever to territorial expansion, maintaining that our national history has not been such as to give our people experience in dealing with this new and essentially foreign question.

Among the short articles are: "Gunpowder as a Lesser Evil," by F. L. Oswald; "The New Diplomacy," by Leon Mead, and "War Correspondents," by John Gilmer Speed.

THE AMERICAN MONTHLY REVIEW OF REVIEWS for March has for frontispieces the late M. Felix Faure, of whom a biographical sketch is given, with illustrations of the events and scenes of his life.

"The Progress of the World" is, as usual, a trenchant, though comprehensive, summary. "Record of Current Events," with portraits of Rear-Admiral Bunce, Commodore Philip, Vice-Admiral Sir H. F. Stephenson, Vice-Admiral Sir H. H. Rawson, Joseph V. Quarles, P. J. McCumber, Adison S. Foster, Sir Henry Hawkins, the late C. S. Robinson, and the late Bishop Williams. "Major-General Elwell Stephen Otis," by William Conant Church, with portrait. "Philippine Types and Characteristics," "The Condition of Porto Rico," "An American Farmer's Balance-sheet for 1898," "Characteristics and Possibilities of Middle Western Literature." Periodicals and Books reviewed.

IN THE APRIL ISSUE OF HARPER'S MAGAZINE appears the first instalment of a serial by H. B. Marriott Watson, who made his reputation as a novelist by the publication of "Galloping Dick." The serial is entitled "The Princess Xenia," and is fully illustrated by T. de Thulstrup. Henry Cabot Lodge, in Part III. of the "History of the Spanish-American War," discusses the blockade of Cuba and the pursuit of Cervera. The illustrations which accompany this article are alone worth the price of the magazine. Other war articles of exceptional interest are "The Trial of the Oregon," by Rear-Admiral L. A. Beardslee, U. S. N.; "The Rescue of Admiral Cervera," by Peter Keller, an American Jacky, and "Honor to Whom Honor is Due," by R. F. Zogbaum. Among the special articles are "Aspects of Rome," by Arthur Symons; "Cromwell and His Court," by Amelia Barr; "The Ape of Death," by Andrew Wilson; and "The Equipment of the Modern City House," by Russell Sturgis.

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THE FRUITS OF SANITARY SCIENCE.

By PROF. J. B. JOHNSON, Instructor of Civil Engineering, Washington University, St. Louis, Mo.*

. . . What is it that has brought about an organized action of all nations in respect to sanitary matters? Evidently the feeling that pervades all intelligent communities that at last we have found the true cause of infectious diseases, and hence are prepared to intelligently combat them. This cause is now acknowledged to be the taking into the system, either from the air, or in our food, or in our drinking water, some of the various kinds of injurious micro-organisms, known as bacteria. Of the great variety of these, only a few are pathogenic, or disease producing, and by the wonderful discoveries of Pasteur and Koch and a host of followers, we are already well advanced toward a complete knowledge of these hitherto inscrutable sources of the most fatal of human maladies. Even now it is fully established that about 40 per cent. of all deaths are due to this class of diseases, but formerly fully 75 per cent. of deaths must have been due to these causes.

Among the diseases now known to be of bacterial origin may be mentioned, in the order of their virulence: Consumption, pneumonia, diarrhœal diseases, diphtheria, typhoid fever, malarial fever, measles, whooping-cough, scarlet fever and smallpox.

The total number of deaths occurring annually in the United States by the 1890 census, from these causes, is over 350,000. It will be noticed that the above list does not include cholera or yellow fever, which have a similar origin, but which we may regard as imported diseases. The ten diseases named we have always with

* Farewell Address, under the auspices of the Washington University, Association, St. Louis, Mo., Jan. 23, 1899, on the eve of his departure for Wisconsin University, having accepted the position of Dean of that institution.

us, and hence they may be considered indigenous to the soil. What family is there in the whole land that does not count one or more members lost in youth or in the vigor of early or middle life by some of these fatal causes? If all these be caused by preventable infection, then we must conclude that more than 350,000 people in the United States alone are annually sacrificed to ignorance, to indifference, or to incompetence, or to all combined.

And now, believing this to be true, how should we act? Evidently we should use all possible means to learn how these pathogenic bacteria are commonly transmitted from the sick to the well, and then take the necessary precautions to prevent such transmission. As we all know, a vast amount of work of this kind has been done. We find that these germs are carried either in the air, or in food and drink. Those diseases which manifest themselves in ailments of the throat or lungs, as consumption, pneumonia, diphtheria, whooping-cough and scarlet fever, are commonly caused by air-borne germs and are introduced with the air we breathe. On the other hand, typhoid and malarial fevers, cholera and diarrhœal diseases are caused by water-borne bacteria, which are introduced through the stomach. Since the air is breathed in common by everybody in the same inclosure, the only safety here lies in the isolation of the patients, in a plentiful supply of pure air by way of ventilation, and in the prevention, so far as possible, of the spread of the germs into the common atmosphere. Thus in the case of these air-borne germs they are not always expelled from the diseased person in the expired breath, but may escape through the skin, and in throat and lung diseases they are found in myriads in the sputum. If this be allowed to dry in the open air, then the germs are taken up as dust and carried to the throat or lungs of another person who breathes this germ-laden air. This is the common form of contagion in the case of consumption, pneumonia and diphtheria, and hence those offensive notices of prohibition of spitting in inclosed public places which we are now only beginning to see. The drying of expectorations in street and railway cars, stores, factories, schools, assembly halls, hotels, and even in our legislative chambers, has hitherto been a fertile source of contagion. I have myself seen the floor hot-air registers in the House of Representatives at Washington commonly used as cuspidors. In fact, because of their collection of dust and sweepings alone, floor registers are a constant menace to health and should never be allowed.

While pulmonary consumption is still generally regarded as an incurable disease when once fairly developed, it is no longer held to be hereditary. A physical weakness may have been inherited which would predispose one to the attacks of this particular microbe, but this weakness would not of itself bring the disease. The specific seeds must be planted and these must come from another diseased person or animal. It has been found that cattle are afflicted with these same microbes, and in extreme cases they may be found in the milk and meat from diseased cattle. The preventive measures must therefore begin with the tributary domestic animals, and every possible means employed to keep both air and food free from infection. Even domestic pests, like rats and mice, and also the domestic pets, as cats and dogs, come in for careful scrutiny, and the possibilities in this direction must be thoroughly examined into. And more than all these, perhaps, the festive fly is now charged with being a common carrier of disease germs, and it is to this apparently innocent and industrious little companion, more than to all other causes combined, that we now credit the astonishing spread of typhoid fever in our recent military camps.

In the case of the water-borne bacteria, as those producing typhoid and malarial fevers, cholera and diarrhœal diseases, the most common means of distribution has been the drinking water. A great many proofs of this have been found which cannot be reviewed here. But a few other means of bringing these into our food and drink have been traced out. Thus a polluted water used in washing milk cans (without charging actual dilution) has been known to spread this disease to all the customers of the dairy following the practice. Since these sources are now commonly accepted as those from which typhoid fever arises, I need not dwell upon them here. The proofs, however, are numerous and indisputable, and are universally accepted by all who have examined into the matter.

That malarial diseases, including ague and intermittent fevers, are to be traced directly to the drinking water is not so generally accepted. That this is true, however, has now been fully established, and I will cite a single case which alone is sufficient to prove the claim. At Brownsville, Tex., on the Rio Grande river, is a United States military post which takes its water from the Rio Grande. It is also surrounded by what are commonly accepted as the most typical malarial conditions, such as swamps and stag-

nant lagoons. Up to 1890 the hospital record of this post was by far the worst in the country in the matter of malarial diseases. The medical report for this station in 1890 gave 18.76 hospital admissions per thousand of strength, and this was a normal number for the post.

In the following year an ice plant was installed to serve the post, and incidentally a condenser coil was added to obtain distilled water for drinking purposes. A year later this water was found so beneficial that it was at once supplied to the entire post for drinking and for all culinary purposes. In the following year the hospital admissions for malarial diseases fell to 16 per thousand of strength, or less than 1 per cent. of what they had been regularly during the entire life of the post.

In all cooked food disease germs, when present, are probably destroyed if the cooking is effectual, so we need only attend to the raw food and to the unboiled liquids taken into the system. Here come all fruits, berries, salads and vegetables eaten raw, many of them without even a thorough cleansing in cold water, to say nothing of having been sterilized by heat. No doubt much injury results in this way to persons of deranged digestive organs. The remedy is to cleanse thoroughly all such foods in a pure cold water suitable for drinking.

In a general way we may say that moisture, warmth and darkness are favorable conditions for the growth of these invidious parasites, and, on the contrary, we know that dryness, cold and sunshine are fatal to most of them. Hence we find a continually moist soil, too many shade trees and damp and moldy cellars are unhealthy, while a well-drained soil, considerable sunshine and dry cellars are known to be conducive to the most perfect health. These facts being known in advance, the adverse conditions can usually be avoided and the lives of the family correspondingly prolonged. So also we see how whole States, as Indiana, for instance, have been changed from exceedingly unhealthful to perfectly healthful conditions by merely draining the ground for agricultural purposes. Formerly intermittent fevers were almost universal every fall all over that State. Now they are almost unknown, and with this change has come a change, not only of the faces of the people, but of the face of the country.

I am told that some years ago a party of St. Louis gentlemen were riding in an express train from Indianapolis eastward. They were admiring the (to them) surprising prosperity and thrift

visible on all sides, and the bright and happy faces of the people, and were contrasting the present conditions with what they had known of the Hoosier State in earlier days. The change was so wonderful that it seemed to call for some unusual explanation. Several explanations were offered, such as education, the Christian religion, politics, good crops, etc. Finally one of the number told them they were all wrong. Said he: "The cause of it all is drain 'tile!'" And I think he was right. The drainage of the soil had not only improved the crops, thus leading to increased wealth, but it had changed a swampy, water-logged, bacteria-infested soil and contaminated well water to a dry, aerated, purified and purifying soil, that is to say: a bacteria destroying filter-bed, covering the whole face of the country, and so keeping pure and sterile the ground water, which supplied the wells and from which, formerly, they had swallowed with every glass of well water millions of malaria-producing bacterial germs.

It is in the purification of our drinking water, however, that sanitary science has probably secured its greatest triumph. There are in general but two sources of water for domestic use, namely, surface waters and ground waters. Since all surface waters, whether rivers or lakes, are composed mostly of the run-off from the surface, they must of necessity contain those impurities which are washed from the earth's surface by the cleansing rains. These are carried either in solution or in suspension, and along with inert organic or inorganic matter will always be found some thousands of bacterial forms of life in every swallow of water. As most of these are entirely harmless we suffer no detriment, but occasionally we find some of the disease-producing bacilli previously referred to, and then, if the system is found to be in a susceptible condition, lodgment is effected, poisons produced and sickness results. In the case of ground water also, if this be in direct and close communication with the surface drainage, it is likely to be as fully contaminated as the surface water, and often very much worse.

It is only in the case of water from deep wells, which are wholly cut off from all surface contamination, that water can be obtained absolutely free from bacterial life. Such a supply is that of Memphis, Tenn., where the artesian-well water comes from a large deposit of pure quartz sand, some hundred miles in extent, which outcrops in Central Tennessee, but which at Memphis is several hundred feet below the surface, from which it is entirely cut off

by a thick stratum of blue clay. In the case of artesian waters, generally, while they are likely to be highly charged with inorganic matter in solution, they are quite free from all organic pollution and from all forms of bacterial life.

Since these sources of supply are very exceptional, however, but few cities can be supplied in this way, most of them having to rely upon the use of surface waters. In these cases, in order that they may be entirely healthy, they must be freed from their bacterial life. One of the greatest triumphs of sanitary science, as stated above, consists in proving, beyond a reasonable doubt, that this purification is effected by filtration through fine sand. Evidently the efficiency of the process does not consist in the mere straining of the water, for these micro-organisms will pass readily through the closest filter paper, and probably wherever the water can go, so far as any mechanical restriction is concerned they can go. The action of a sand filter is something very different. Indeed the efficiency of a sand filter arises from the presence in the water of certain microscopic vegetable growths, which are collected on the sand grains on and near the top of the filter and there form a kind of porous blanket covering, through which the water to be filtered must pass. This covering is of a tough and spongy nature and is itself a growing vegetable. This gelatinous covering furnishes enticing habitations for the innumerable families of water bacteria, which here find a home. These, in turn, attack and consume the organic matter in the water as it slowly moves downward through this superficial blanket of living and hungry organisms, so that, after passing through such a film not over a quarter of an inch thick, the water is found to have lost both its bacteria and a very large proportion of its other organic matter.

As an illustration of the efficiency of sand filtration in removing the bacteria from drinking waters, we find for the year ending May 1, 1898, from daily examinations made at Lawrence, Mass., the average number of bacteria per cubic centimetre was 5,781. After filtering, this number was reduced to an average of 37. In other words, 99.36 per cent. of them had been removed. The work here is under the direction of Hiram F. Mills, the sanitary engineer who conducted the remarkable investigation into the theory and practice of sand filtration both for water and sewage of the Massachusetts State Board of Health, and it only shows what may probably be accomplished anywhere with proper intelligence and care.

As an evidence of the practical benefits of this filtration we need only to look at the record of deaths from typhoid fever at Lawrence before and after the filtering of their water supply. Thus, for six years before filtering the water, the average annual number of deaths from this cause was 52.5 for the six years—1887-1892. This is an average of 119 per 100,000 annually.

If we care for more evidence of a similar character, we can find an abundance of it in various places. Thus the city of Chicago had an average typhoid fever death rate previous to 1893 of 116 per 100,000. In that year they brought into service the inlet crib four miles from shore and abandoned the two-mile inlet that had been in use. The typhoid death rate speedily dropped to an average of 36 per 100,000.

SCHOOL SANITATION.

At the meeting of the Board of Education, Poughkeepsie, N. Y., March 1, Superintendent HARRIS presented the following report, prefacing it by saying that he had received many points while at the National Council of Superintendents, at Columbus, and had also come into possession of some of the following statistics:

Dr. Burnham, of Clark University, has compiled the conclusions of the best European and American authorities on the subject of school sanitation. I quote the minimum requirements which all these experts agree upon as affording reasonably good sanitary conditions:

a. School buildings should not be more than two stories high.

b. All school rooms should contain air space equal to 250 cubic feet per pupil.

c. All school rooms should contain floor space equal to 20 square feet for each pupil.

d. The square feet of window surface should be at least one-filth of the square feet of floor surface.

e. No pupil should be seated farther away from the window than one-half times the distance from the top of the window to the floor.

f. No school room should be heated by direct radiation.

g. Air from the outside should always be used to furnish fresh air for the rooms.

h. Quantities of fresh air moderately warm should be furnished, and in no case should fresh air be heated to high temperature, because it is thereby vitiated.

i. Pupils should be furnished at least 30 cubic feet of air per minute.

I wish it were practicable to submit to the board the arguments and experiments which caused these experts to reach these conclusions and which give them the prestige of scientific accuracy.

I should like also to present the results of investigations regarding school desks and wall tints.

It seems to me, however, that no one will question the conclusions, and I recommend that the board present to the parents and taxpayers of our city a comparison of our school rooms with these standards, which I have already stated are minimum ones.

I would also ask that a careful investigation be made to determine how much imperfect sanitary conditions have to do with:

a. Irritability and restlessness of pupils.

b. Weariness of the teachers.

c. Recurrent headaches.

d. Colds (because of open windows).

e. The spread of disease. Are disease germs allowed to float about the school because they are not rushed out by proper ventilation?

f. Deformities from improper postures.

g. Defective vision.

Last year a test was made by the physician members of this board which showed an alarming prevalence of defective eyesight. I urge that the same tests be made in all the schools.

Much has been officially said—and otherwise—about the sanitary condition of our schools, but sound conclusions can be reached only as the result of careful investigations. I believe that our citizens ought to know and are anxious to know how near to good sanitary conditions our schools really are.

Commissioner LeRay moved that the medical members prepare a statement as recommended by the superintendent and give it to the taxpayers through the newspapers. Mr. Harris said that he would be glad to furnish the members of this committee with further statistics and do all that he could to help the matter along. Mr. LeRay's motion was carried.

SANITARY CONDITION AND VITAL STATISTICS OF NUEVITAS AND PUERTO PRINCIPE, CUBA.

By S. T. ARMSTRONG, Major and Brigade Surgeon, U. S. V.

, Communicated by the Surgeon-General, U. S. Army.

NUEVITAS.

Nuevitas is the principal seaport on the north coast of the Province of Puerto Principe, Cuba, and is situated about latitude 22° N. by longitude 77° W. It is located on the west bank of the large but shallow bay of Nuevitas, about fifteen miles from the open sea. While the bay has an area some fifty miles in extent, the entrance from the ocean is a narrow channel over four miles long, and as the tide averages but two feet in its rise, there must be but moderate change in the volume of water that constitutes the bay. Two small rivers empty into the bay, but each at a considerable distance from the site of the town, and there is no exposed marshy ground in its vicinage. The ground on which the town is located rises in a gradual slope from the sea level to an elevation of one hundred and thirty feet. The soil is clayey, but in many places the underlying rock is exposed, and constitutes the roadbed of the streets or the foundations of the houses. This hilly site makes terraces of some and steep inclines of other streets.

None of the streets are paved, and while they have been made the dumping ground for more or less refuse, several inspections failed to show any material likely to be detrimental to public health. An advantage of the steep grade of the streets is that each rain washes the surface material into the bay. In the wet season those streets that have a clay roadbed are said to be almost impassable.

There is not a sewer in the place. Each house has an excavation in the ground, which is sometimes cemented, that is used as a privy. These are sometimes cleaned out by hand, and sometimes they are partly washed out by the heavy rains. If there were sewers, it would be necessary to carry their outlet some five miles out in the bay, otherwise there would be in time water pollution in consequence of a layer of sewage near shore that was not displaced by the daily tide or tidal currents.

There is no system of municipal garbage collection; householders from time to time remove that which accumulates about their residences.

The water supply is altogether from underground cisterns. These are necessarily likely to be contaminated by seepage from the adjoining privies. There is one large cistern that has a brick collecting platform built about it, and this water is sold to the troops and to other purchasers. The proximity of a well-traveled road is likely to cause dust contamination of this cistern's water.

There is a municipal physician who is paid a salary of $50 per month to attend to the indigent sick. There is no public or private hospital.

The business of the city is almost entirely that of a port of entry for Puerto Principe, with which city it is connected by a railroad nearly forty-six miles long. There is a steamship line that has regular steamers stop en route from Havana to Santiago and return; and there is a steamship line to New York. In consequence of the shallow water, all vessels must lie from two to six miles off shore, and the cargo is lightered to a pier, whence it is transferred. So there is not much likelihood of infection of the piers by foul ships.

There is a quarantine officer, a local physician, who visits incoming ships, but there is no quarantine plant.

While it was near this place that Columbus landed in 1492, there are no available records that show the date of settlement of the town. It was officially reported that the population in 1896 was 6,991, but it is unlikely that there are now more than 3,000 inhabitants.

The system of registration of deaths that exists in the Island of Cuba is in use, and the records for five years, 1894-'98, were collated and tabulated. The causes of death and the total number recorded (abstract of table) as follows: From malarial fever, 33; pernicious fever, 43; yellow fever, 61; typhoid fever, 45; tetanus, 30; tuberculosis, 79; other infectious diseases, 11; diseases of nutrition, 54; diseases of nervous system, 47; diseases of digestive system, 135; diseases of circulatory system, 71; diseases of respiratory system, 34; diseases of genito-urinary system, 20; wounds and injuries, 39; unclassified, 98. Totals—In 1894, 85; 1895, 139; 1896, 204; 1897, 164; 1898, 208.

An inspection of these tables shows that there was no case of yellow fever in 1894, but coincident with the introduction of troops

in 1895, when the war of revolution commenced, there were 40 deaths from that disease; this number was decreased to 14 in 1896, to 7 in 1897, and there were no deaths therefrom in 1898.

Whether this exemption was due to the exhaustion of susceptible material or to the virtual cessation of commercial and military intercourse with Havana is difficult to determine. Though it is generally believed that the germ of yellow fever is endemic, yet it would seem worth while to establish an efficient inspection service of all vessels from Havana or other ports where yellow fever existed, and to apply the principle of maritime sanitation to such vessels and their cargoes.

The increase in the mortality caused by malarial and pernicious fevers in 1898 (29 and 35, against 4 and 8 of preceding years, respectively) can only be explained by the privations and exposure associated with war. The site of the town and the environment are such that there is no immediate source of malarial infection, except the prevalence of mosquitoes, and it is believed that the coming years will witness a decrease in the mortality caused by paludism.

The amount of typhoid fever is less than might have been expected in a place where the water supply is so subject to fæcal contamination.

The prevalence of tetanus is largely among children; deaths of adults in consequence of this disease are evidence that the infection is constantly present, and the general employment of midwives explains the infantile mortality from tetanus.

Damp houses, insanitary habits, intermarriage and total want of any appreciation of the significance of tuberculosis explains the death rate from that disease.

The large number of deaths caused by diseases of the digestive system seems to be attributable to the infected water supply.

The table of mortality by months indicates that February, March, April and June have the smallest death rate.

The table of mortality by age periods shows, as usual, that the heaviest mortality occurs during the first five years of life. In consequence of the lack of figures in regard to the population, it is not possible to calculate the death rate per thousand per quinquennial age period.

The recommendations for the sanitary improvement of this place include, beside the better system of quarantine inspection that was referred to, improvement in the streets by filling in and con-

structing gutters to remove the surface water without washing the roadbed. Also a system of garbage removal by paid scavengers, who could, in so small a town, sweep the streets as well.

The purchase by the municipality of pneumatic excavating apparatus, which should be worked by trained scavengers, and the regular cleansing of all privy vaults. Any plan of sewer construction in the rocky soil would be too expensive for the limited resources of the inhabitants.

The construction of an artesian well and of public stations of water supply at convenient intervals is very desirable.

The municipal or quarantine physician—both functions could be discharged by one man in a place where commerce is so limited—should also perform the duties of sanitary inspector. This arrangement would permit the payment of a fair salary to one good physician, rather than meagre salaries to two physicians.

PUERTO PRINCIPE.

This city is the principal place in the province of the same name, and is situated about 21° 20′ N. latitude and 77° 55′ W. longitude, located on a broad, rolling, sandy plain, near the junction of two small streams, the Hatibonico and the Tinima rivers. It is distant about thirty-five milecs from the northern and forty-five miles from the southern coasts, and the elevation, as well as the open character of the country, affords ample opportunity for the free play of the trade winds from the northeast.

Originally the situation of the village of an Indian Cacique, the place was occupied by the Spaniards in 1514, and with the development of the province into the most important cattle raising section of Cuba, the town increased in size until, in 1868, it had a population of 62,527; but subsequent to the ten years war it lost in population, and in 1879 had 55,459, in 1894 but 40,679, while at the present time it is doubtful if there are more than 25,000 inhabitants.

The antiquity of the place of the city is evident from the narrow, tortuous streets, often without or with very narrow sidewalks, and paved with cobblestones or unpaved and having for a roadbed the sandy soil or the exposed rock. There are no gutters at the sides of the streets, and in the rainy season there may be a depth of from six to eighteen inches of rainwater, which drains off into the Hatibonico river. While there is no system of street cleaning, there is not the dirt or refuse in the street that is said to

be a feature of many Cuban cities. Municipal sanitary regulations have prevented the fouling of the public roads by careless or dirty individuals. There are many streets that would be decidedly improved if they had good roadbeds, for there are places near the heart of the city where the exposed rock is so rough and irregularly worn that it is impossible to use a carriage.

Whether in consequence of the general close proximity of the rock strata to the surface of the ground, or because of indifference, is not known, but there has been no sewer construction in the place during its many years of existence as an inhabited town. Unlike our American cities, there are no detached houses in the city, each building abuts on two or more neighboring structures; and somewhere in the courtyard is the cemented or uncemented pit, dirty in its environment, foul in its odor, that is the receptacle for the excrement of the residents. These privies are only emptied when it is absolutely necessary, and then the labor is performed by a class of scavengers engaged in this work, who charge so much a bucket of filth removed, or so much for emptying the entire vault. Within the same area as the privy is the cistern or well, the former receiving the water collected on the roof of the house. It is said that plans were once prepared for an aqueduct that would, for less than $100,000 have brought an ample supply of good water to the city.

The rivers are too small, the volume of flow too inconsiderable in the dry and too contaminated in the wet season, and the likelihood of the water pollution at all times too great to make them desirable sources of supply.

The registration of deaths has been very carefully regarded and the certificates were collated for the quinquennium 1894 to 1898, and the results tabulated in the accompanying tables (mostly omitted). These present some very interesting facts, for we note that the total of deaths in 1894, amounting to 721, was increased in 1895 to 1,699, a total in a great part due to the deaths from yellow fever and in part accountable by the increase in the number of inhabitants because of the arrival of a large number of Spanish troops. In 1896 there was a slight decrease from the previous year to 1,328 deaths; these were not in great part among the young Spanish soldiers, but among those concentrated in the city and unable to get work or food; in 1897 there were 1,316 deaths, and in 1898 there were 1,356 deaths. Assuming a population of 25,000 the rate would have averaged 56.9 per thousand during the past four years.

An inspection of the tables will show the maladies that were most important in causing the heavy mortality, and first among these are the infectious diseases. Typhoid fever, while causing fewer deaths than would have been expected where there is such a water supply, has caused an increased number of deaths since 1894. Since that year the deaths from pernicious fever have markedly increased. Yellow fever caused 26 deaths in 1894; 696 in 1895, in consequence of the arrival of fresh Spanish troops; 59 deaths in 1896, all but six of which were in the first months of the year, and the others were evidently the expiring embers, so to speak, of the epidemic of 1895; but 3 deaths in 1897, and only 2 deaths in 1898. The local physicians consider that yellow fever is an epidemic and omnipresent disease, an inference that seems justified by the fact that very few of the deaths from this fever occurred in Cubans.

Tetanus and glanders are two infectious diseases that are more or less constantly present. Tuberculosis caused on an average one-seventh of the deaths, a matter that is not surprising when it is remembered that intermarriage is very common, that no precautions are taken to prevent its spread, and that the majority of the people live on the ground floor of houses that have no subsoil drainage, and where the level of the ground water is frequently high and results in damp apartments. The last mentioned condition is believed to be an important factor in the causation of rheumatism, with cardiac complications, and resultant mortality due to cardiopathies.

The character of the water supply is believed to be largely responsible for the number of deaths caused by diseases of the gastro-intestinal tract.

The want of definite data in regard to the present population makes the tables of deaths by ages less valuable than they would be if the rates per thousand could be calculated.

There is a hospital for men, one for women, and one for the insane and lepers. Each of these institutions has its own visiting physician, who is paid a moderate salary in recognition of his services.

The city has in its employ a coroner, a jail physician, and a municipal physician to treat the indigent poor, each of whom is paid $50 per month; a vaccine physician, who is paid $100 a month to continue the production of vaccine by the inoculation of heifers, and to vaccinate any who may call at his office, and an

analyist, who is supposed to examine food and drink; an inspection of the laboratory equipment of this official showed a limited stock of apparatus, and reagents that had not had their original covers taken off since their purchase four years ago. None of these officials report to any superior. The work would be materially benefited by consolidation of some of these offices.

There is no system of sanitary inspection save that conducted under the auspices of the medical department of the army.

There should be an organization of a municipal bureau of health and vital statistics, conducted on the plans of work familiar in the United States.

There should be a system of street cleaning, of sewage disposal, and of water supply. At present the lack of funds and the authority to inaugurate such work is a serious handicap to the betterment of this community.

Mortality in each month in Puerto Principe, Cuba, 1894 to 1898, inclusive:

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1894	75	67	49	60	66	61	68	67	53	41	62	52
1895	55	53	65	73	109	184	254	221	247	189	127	122
1896	120	131	144	128	112	95	105	76	76	113	98	130
1897	135	94	129	140	147	150	100	74	67	70	89	120
1898	130	125	108	110	107	126	90	75	103	119	118	143
Total	515	470	492	511	541	616	617	513	546	532	494	567

SANITATION IN HAVANA.

Some idea of the progress of the work may be gathered from the following figures, which are taken from the official report of Col. Black, of the United States Engineer Corps, the head of the department. The report covered the week ending March 11:

Total number employees of department (approximate).....2,700
City carts used for street cleaning..... 20
Hired carts used for street cleaning..... 86
Scow loads dirt and garbage towed to sea and dumped..... 27
Repaving (square metres).....1,488
Macadamizing (square metres).....3,779
Sewers cleaned (running feet).....3,708

The following figures indicate the various occupations of a part of this considerable army of employees: Street-sweeping, 661; park-cleaning, 59; paving, 90; macadamizing, 71; at dump-heaps, 66; sewers and water service, 210; cleaning and renovating public buildings and fortifications, 1,030. The others are employed in an almost endless variety of repairing, renovating, maintaining, and cleaning of all sorts of things in all sorts of places. Some are engaged in departments of construction. All are usefully employed, and many more might be. A mountain of rubbish, debris, garbage and filth has already been dumped into the waters of the Florida straits. But the undertaking of the cleaning of Havana began long ago to manifest, in exaggerated degree, the peculiarity of the widow's cruse and meal-chest. The more the department digs, and the more it carts away, the more there seems to be left. Even with all that has been done, there are buildings and courtyards, seemingly endless in number, whose loathsome and disgusting foulness beggars description. The human system is certainly an elastic institution; and people, as well as pigs, may fatten on foulness. In some of these reeking, nauseating, but often densely populated courts, I have seen children whose activity and plumpness gave every evidence of health, and adults who were strong and robust. As some people grow rich by rascality, so do others appear to thrive, physically, on corruption and sink-drains. It is a queer old world, anyway.

Some time ago I reported the use of 1,800 barrels of lime on the old Spanish garbage dump on the southern border of the city. Up to the present time, 4,000 barrels have been spread out on it. That is none too much.

Gen. Ludlow is unfortunate in being obliged to labor under limitations which should not be imposed upon a man in his position. He is situated somewhat like a business man whose expenditures and purchases are based upon the unknown quantity of his prospective sales, and not upon what is known as working capital. No fixed sum is accorded him upon which he can base his outlay. The chief source of financial supply is the revenue of the custom-house. What that revenue will be and what portion of it will be allotted to the city of Havana are both indeterminate. The result of this unbusinesslike system is a vagueness and uncertainty which are perplexing to the local officials and detrimental to the interests of the city. A considerable measure of this condition could be easily relieved if the authorities at Washington, or the Governor-

General of the island, or anybody else with whom the authority rests, were to confer upon Cuban municipalities the right of local taxation. The general principles of local taxation are fairly clear. Certain forms of property, certain lines of trade and commerce, certain institutions and establishments, are almost universally recognized as fit and proper subjects for a just and legitimate taxation. Certain other interests and properties are either commonly or occasionally included in the same category. A few good business principles could easily be injected into the economic administration of the island to Cuba with very wholesome results.

THE NEW YORK PUBLIC LIBRARY ASTOR, LENOX AND TILDEN FOUNDATIONS.

As things are, Havana and the other cities of Cuba are given work which suggests one of Pharaoh's methods of utilizing the children of Israel. They may not be expected to make bricks without straw, but it does seem to be expected of them that they shall produce a very large and very beautiful pile of bricks with little or no knowledge of the amount of material to be supplied them. This simile weakens under the logic of the situation. One may continue to make bricks with straw as long as the straw holds out, and then proceed to make such bricks as he can with what material he has. Then he can stop because he must. Cities cannot be run on that principle. A snag is struck at the third proposition. City work cannot stop. It must go on under penalty of disorder and disease. To avoid this penalty two departments, the police and the sanitary, are established. Both must be provided for, and the provision must be made upon some basis of known income. They cannot be operated upon any hand-to-mouth principle, nor can clerks and officials in the various departments of municipal administration be hired by the hour or by the day. There is a good deal of difficulty and embarrassment in trying to run a municipality of 200,000 people on the basis of no appropriations and an uncertain and indefinite income.

The Medical Department, under Major Davis, operates independently, and co-operates with the mechanical department of city sanitation in the battle against disease germs and disease-producing conditions. As one investigates the sanitary conditions of Havana, even after so much has been done, it becomes a matter of half-serious speculation whether it would not be wise to oblige every man, woman and child in the place to file out of it and wade through a long stretch of sea-water, to emerge at some point a dozen or two miles away, and there stand, arrayed in nothing save such innocence as they had, like Kipling's little troupe at the battle

of Lungtungpen, while the city was burned from Atares to La Punta. This proposition was actually made in all seriousness last fall. So drastic a measure will undoubtedly be averted, but there are scores of areas and hundreds of buildings for which a cleansing by a baptism of fire would be much the wisest plan.

In Havana, as in the rest of the island, new plans are being instituted in the work of relief. The strings are being much more tightly drawn, and imposition is being frozen out. The reduction in Havana has brought down the number of those maintained by government rations from over 20,000 per day to something like 8,000, and I have heard of no cases of death from starvation as a consequence. It is perhaps not well to be overcensorious regarding this lavish distribution in which so many of the unworthy have shared. Until a more rigid system could be put into operation, some measure of indiscriminate profusion seemed necessary and unavoidable. Previous letters have indicated that the time was come which made measureless pauperism a serious and threatening danger, and it is wholly well that the step has now been taken. I do not wish to minimize the need which still exists in Cuba. Nor would I say a single word which would hold a penny from those who are working for the relief of Cuban sufferers. The suffering and the needy are here, and will be here for months to come. But it is now time when all relief work should be applied with systematic care and judgment. That extravagant generosity which has done so much and which might well have done much more within the past months, is no longer the course of wisdom. Few, if any, are now in serious danger of starvation. Thousands are in danger of pauperism under extravagant systems of distribution. The present is a time for systematic philanthropy rather than for indiscriminate charity.—A. S. R., "Evening Post," March 27, 1899.

THE PLAGUE AND ITS ORIGIN.—M. Proust has sent a lengthy communication to the Académie de Medecine ("Gazette Hebdomadaire," January 1, 1899) on the plague and its origin, its various modes of propagation, epidemics aboard ships, and he cites various incidents of its propagation. He advises the removal of all the sick from the ship, its thorough disinfection, not forgetting the destruction of the rats.

WANTED—A MAN.

HENRY HARRISON LEWIS has contributed to the March number of the British "Fortnightly Review" an article, entitled "General Wood at Santiago," to which the Philadelphia "Public Ledger" invites particular attention on account of its applicability to that city. It is commendable to several other cities in the United States. The author says:

"At the time I concluded my visit of observation there had been just four months of American rule in Santiago de Cuba. These four months had effected:

"The rescue of the population from starvation to a fair satisfaction of all their daily necessities.

"The conversion of one of the foulest cities on earth to one of the cleanest.

"The reduction of an average daily death of 200 down to 10.

"A considerable progress in a scheme of street and road improvement that will add immensely to the convenience and beauty of the city.

"A radical reform in the custom house service, resulting in increased revenues.

"A reduction in the municipal expenses.

"The correction of numerous abuses in the management of gaols and hospitals and in the care of the inmates.

"The liberation of many prisoners held on trivial or no charges.

"The reformation of the courts and a strict maintenance of law and order.

"The freedom of the press.

"A restoration of business confidence and a recovery of trade and industry from utter stagnation to healthy activity.

"This unparalleled regeneration had been wrought, not by a host of men native to the locality, and occupying offices long established, but by an American Brigadier-General of Volunteers, a stranger to the place and the people, embarked in the work on a moment's notice, and having for his immediate aids only a few fellow American officers, some of whom had been out of West Point less than two years, and all of whom were as new to the situation as himself."

Consideration of General Wood's record, of the important reforms he has accomplished at Santiago, will, no doubt, suggest to every citizen who desires the improvement of our local government the propriety of General Wood being asked to accept a post under the new municipal administration, say, for instance, that of Director of Public Works. The extraordinary usefulness and efficiency which he has shown at Santiago may possibly disincline the Federal authorities to release him from that post, but if it were made clear to Mr. McKinley that Philadelphia needs reforming in some particulars of administration not less than Santiago did, it is not improbable that the President would be induced to temporarily loan General Wood to this city. Colonel Ludlow, who also has been doing excellent service at Havana, was once loaned to Philadelphia, though it is unfortunately true that when he exhibited honesty, intelligence, skill and energy in his efforts to provide the city with an adequate supply of pure, wholesome water, the political jobbers in City Councils, who were and still are opposed to any plan which has "nothing in it," except that kind of water, for themselves, dismissed and sent him back to the army.

There is reason, however, for the belief or hope that in the present indignant state of the public mind, if General Wood were released from his command in Cuba and loaned to Philadelphia long enough to accomplish necessary reforms of administration, popular sentiment would render his dismissal by Councils from his new field of usefulness, no matter how honest, efficient and energetic he might be in antagonizing the political jobbers in and out of that body, difficult or impossible.

The present greatest need of Philadelphia is a man of the proved integrity, courage and ability of General Wood. As Director of Public Works, with complete authority from Mayor Ashbridge to effect all necessary reforms in the management and scope of that great office, the General would be likely, or certain, to accomplish a revolution which would sweep out of that department all political jobbery, incompetency, extravagance, sloth, ignorance and favoritism. Pure water and plenty of it would take the place under his direction of the present often scant supply of impure water, or sewerage, filled with the germs of disease and death. He would take all employees under his direction out of politics. He would prohibit, not exact or encourage, the assessment of their salaries "for political purposes," which generally means for padding the assessors' lists, bribing election officers, buying votes and

the consummation of all kinds of ballot box frauds. He would tolerate no officer of the Street Cleaning Bureau who considered he was paid his hire and salary to excuse or justify the failure of contractors to observe the conditions of their contracts; he would throw out of the bureau such inspectors as swore that the streets were clean when they were reeking with filth; contractors would do the work they contracted to do or they would not be paid for doing it. He would permit no unnecessary retainers in the department, put there and kept there at the taxpayers' cost for the benefit of practical politicians. For every dollar of the people's money spent on public work he would demand service rendered of the full value of 100 cents.

That is the kind of man Philadelphia needs and the kind that Mayor Ashbridge would undoubtedly wish to have to assist in making his administration pre-eminently useful to his fellow citizens and honorable to himself. As we have said, possibly the Government would not consent to release General Wood from his present field of usefulness and lend him to Philadelphia as it previously loaned General Ludlow, but should General Wood's services be not attainable, might not those of a real, live, honest, courageous man such as he is, be secured for the city by the Mayor-elect? Among the million and a quarter of citizens it should not be difficult, going quite outside the unscrupulous group of place hunting politicians, to find a man of established probity, ability and determination to lift the Department of Public Works, and that of Public Safety also, out of the rut of sordid politics into the clean, smooth, straight road of practical business, and conduct it upon business principles. If Colonel Wood's services cannot be had, then the next most competent man available should be selected for this important post, and another of like worth and ability for the office of Director of Public Safety.

AN APT SCHOLAR.—"John, what is the past of see?"

"Seen, sir."

"No, John, it is saw."

"Yes, sir, and if a *sea*-fish swims by me it becomes a *saw*-fish, when it is past and can't be *seen*."

"John, go home. Ask your mother to soak your feet in hot water, to prevent a rush of brains to the head."

A FILTHY WATER SUPPLY.

Health of Middleboro People Menaced.

Down in old Plymouth county, Massachusetts, within the wide bounds of the town of Middleboro, there flows the pretty little Nemasket river. Its waters come from Assawampset pond, from which the city of Taunton draws a large part of its water supply. The water supply of Middleboro is taken by a pumping station from a large well near the Nemasket river. Most of the water in this well comes from springs on the banks, but some steals in from the river.

A short distance below this well, on the other side of the little river, is the thickly settled part of the town. What used to be called "the court end" of the town is the nearest. From this "court end" runs a sewer toward the river, which is about half a mile from its main street. When this sewer reaches a point about 300 feet from the river it comes abruptly to an end and pours its contents into an open ditch, which runs from the sewer directly to the river.

Along the top of the sewer are manholes, with perforated tops to permit gas to escape, and, according to those who have nosed about that place, such escape takes place. But the unfinished road under which this sewer runs is called by the sweet name of Mayflower avenue. Out of the sewer into the open ditch there streams a thick current of filth, which is the sewage and drainage of that part of the town.

When the weather is clear this foul current smells so that the visitor strolling through the fields wonders that "every prospect pleases and only man is vile." During rains and just after them the surface water comes down the sewer in such quantities that some of it escapes by rushing along on the top of the ever running filth. Whether the circumambient air is poisoned by odorless gas as well as perfumed by the smell of indescribable things is a question for science. The olfactories of the laity find it less suffocating during rains than in the otherwise delightful sunshine.

Fathers and mothers of children who play in that fatal air pay taxes for selectmen to lay sewers and for boards of health to guard the public health. If cows are attracted by the plants that flourish on the sides of that richly furnished ditch, nothing prevents them from adding such food to the constituents of their milk. The river bank, for about thirty feet at the sides of the ditch, just before

it empties into the river, is slimy with the overflow of the gray sewage, for the end of the ditch is on a level with the water of the river.

It is a curious experience to climb a tree rising from that fetid swamp and look, first up at the water that flows by the well supplying that town with drinking water, and then down at the loaded fluid that goes to make the mixture drunk by the 1,200 inmates of the State farm at Bridgewater, about five miles below where the Nemasket river flows into the Taunton river. Both are small rivers and Middleboro is a large town.

About twelve miles below the State farm is the filter basin of the city of Taunton. Thus Taunton rejoices in both ends of this water supply. From Assawampset pond, or lake, as some of the moderns like to call it, Taunton draws millions of gallons of the water undefiled by Middleboro, but whenever Taunton draws a part of its water from the Taunton river, which is still a part of its system of supply, such remains of the diluted sewage of Middleboro as has not been drunk by the people of the State farm is furnished to the unsuspecting citizens of Taunton.

But the half has not been told. When the reluctant Nemasket has received the burden of that pestilential ditch, and has flowed discolored below it, the river is checked by a dam. The rise and fall of the water above this dam leaves upon its banks some of the avenging stuff. Below this dam another sewer belches forth upon a sickening sluiceway the sewage and drainage of the most thickly populated part of the town.

During the day the river water is kept above the dam, to be used by the electric works to light parts of the town, in imitation of the extravagance of cities. Hence the filth for that second sewer is not even swept off immediately, although the works are just above it. But the stuff spreads itself over the sluiceway in a wide, shallow stream, which smells like its sister, the ditch already inadequately described.

This stream also runs into the damaged river. From there the doubly infected water, keeping its name Nemasket, if not the character of its source, flows on to a second dam at the Starr mills. Between these points the river's rise and fall wreaks still further revenge by leaving filth upon the banks that belong to the injurious town.

About two miles from the closely populated banks is yet another smaller dam, at a part of the town called Muttock, an abbreviation

of the name of the Indian known in the local history as Chessamuttock. Near here was the Indian trail traveled by warriors whose arrow heads are still turned up by the plough. But when the horse of the ploughman drinks from the river there he swallows water charged with free ammonia and albumenoid ammonia. And although cows who drink this diluted essence of the town are more fortunate, perhaps, than any who feed upon the abominations of the ditch above, the danger to their milk and the purchasers thereof is increasing as the population increases.

Yet Muttock is a pretty place. The high bluff where the Tory Judge Oliver built Oliver Hall before the Revolution looks northward over the river and the woods to Blue Hill in the distant view. Benjamin Franklin and his friends used to drive down from Boston to dine at Oliver Hall, where the water of the river or spring was esteemed as highly as the juice of foreign grapes. The ancient hall was burned by a Revolutionary mob, and seventeen of the doors of the hall are said to have been taken to grace the dwelling of one of the burners, whose patriotism is still kept in memory by these tokens. Judge Oliver was forced to flee for his life, and took refuge in the British ships in Boston harbor.

The present inhabitants of Muttock are wondering whether their dangers to-day are from the land or the water. Malaria has in the last few months attacked them in every house, except one of a little settlement below what is known as Muttock Hill. There is malaria elsewhere in the town, it is said also. But in Muttock it seems to have been superabundant.

The local Board of Health were asked by sufferers to try promptly to use its powers to examine and remove, destroy and prevent these ills. But the mills of the gods ground so slowly that the sufferers and their friends found it expedient to seek a higher ether and pray for relief to the State Board of Health. This board is to give a public hearing on the subject at its rooms in the State House in Boston on November 3. Whether the sewage causes the malaria or not, the chief question is: Is Middleboro breaking the law of the State as well as the law of health?—Boston "Herald."

SCOTCH WEATHER.—On a very wet day in the west of Scotland a traveler, who had been detained a week by bad weather, peevishly asked a native if it always rained in that country. He replied, drily, "No, it snows sometimes."

SPREAD OF DISEASE BY FLIES AND GNATS.

At the meeting of the American Public Health Association, at Ottawa, in September last, Dr. M. A. VEEDER, of Lyons, N. Y., read a paper on "The Spread of Typhoid and Dysenteric Diseases by Flies." Throughout the past summer, he said, he had made many observations in regard to the agency of flies in spreading disease. It required but little patience and skill to obtain cultures of bacilli of varied sorts from fly tracks and from the excrement of flies. Where no precautions are taken against the invasion of flies, and where no disinfectants are used upon such material, there is invariably more or less extension of these diseases. Thus in the suburbs of large cities typhoid fever is apt to be common, and this is usually ascribed to bad drinking water, whereas in many instances it is really due to shallow water closets which the flies frequent and from which they spread infection into every dining room and pantry near by. This is the explanation that has been found to be undoubtedly correct in several small local epidemics which the writer has witnessed.

Thus in the case of an outbreak of dysentery of a very malignant type with forty cases and ten deaths it was noted that the disease extended from house to house radiating from a single centre without reference to water supply or anything else in common. This epidemic, which was strictly localized in a single neighborhood, ceased as if by magic when large quantities of disinfectants were thrown into the closets, and those having the disease were directed to keep solutions strong enough to kill bacteria of every sort constantly in the commodes in use in the houses. This being done, it did not make any difference how numerous the flies were, there being nothing any longer capable of producing disease for them to load themselves with and distribute in such manner as eventually to be taken into human stomachs.

"There is no doubt whatever," continued Dr. Veeder, "that camp fevers and dysentery become most deadly in this very way. Water from swamps or shallow wells in alluvial soil may originate diseases of a malarial type, but these, as a rule, are not very fatal. On the other hand, the sickness that kills comes from the trenches behind the camp reeking with filth borne on insect wings. It requires but little commingling of typhoid or dysenteric material to

produce an epidemic under such conditions. Soldiers selected for their physical hardihood, living in the open air and having plenty to eat and even the very best of water, develop diseases of this type out of all proportions to their prevalence in the rest of the community, and that, too, in localities previously free from anything of the sort. This is commonly ascribed to the hardships they endure. Whereas those same men in an isolated lumber camp, for example, would endure tenfold the privations and exposure to cold and wet and not only would not get sick, but would become more hearty and rugged every day. Nor can the sickness among soldiers be accounted for by dissipation, for they are under greater restraints in this regard than are possible in civil life. And yet they, the flower and pick of the country, sicken and die, far more being killed by disease, as a rule, than by the bullets of the enemy. With practically unlimited resources of men and means such as are to be had in armies, there is no reason why such material as that on which flies fatten should not be so thoroughly disposed of as to be made innocuous as well as inaccessible. It is only a question of a few gallons more or less of disinfectants daily and a little extra care in the disposal of excreta."

Dr. Veeder also described in detail a process he has invented for the reduction of garbage by steam. The process, he says, yields distilled water, clean grease and a dry residue, containing not only the solids obtained directly from the garbage, but also everything filtered out from its watery portions. There is no handling of the material or cooling and reheating, the process being in every way economical as well as cleanly. Only faint, sweetish odors are given off, not more objectionable than those from a malthouse or brewery and not so abundant. The chief point is to have the garbage collected and worked up when as fresh as possible, so as to avoid the smells that would arise from fermentation before the beginning of the process.

PROF. GRASSI'S discovery that the Roman malaria is spread by a particular species of gnats has been verified in a curious manner at the Santo Spirito Hospital at Rome. All attempts to communicate the disease to animals had failed when a patient in the hospital volunteered to have the experiment tried on himself. He was exposed to the gnats, developed the fever, his blood showing malaria bacilli, and was then treated with quinine. The doctors think that they are now in a way to discover a serum that will render people immune to the malaria.

THE DISINFECTION OF DWELLINGS WITH FORMALDEHYDE.*

By PROFESSOR C. FLUEGGE, Medical Privy Councilor and Director of the Hygienic Institute of the University of Breslau.

House disinfection, as now practised, needs reform; it is getting more unpopular both with the public and the profession year by year. Hence the concealment of many cases of infectious disease, and the removal, where disinfection is ordered, of all manner of valuable furniture, no matter how great the chances of its infection may be. The official disinfectors are frequently confronted with an almost empty room when they come to fulfil their duties. The reason for it is undoubtedly the injurious effects of the disinfectants upon the furniture and room, and the damage often done to valued articles when taken to the disinfecting station. This is in part only due to the carelessness of the disinfectors; much of it depends upon the nature of the processes employed. Its result is the popular saying "Two disinfections equal one fire." Besides this, the mechanical methods mostly employed are not distinguishable by the general public from ordinary and much less harmful cleaning."

Much more important, however, is the question of results. Are the majority of the disease germs really destroyed by the methods in use? An affirmative answer can be given only in a very partial sense. Objects placed in the steam oven are purified; but the rooms themselves cannot be properly disinfected. Large surfaces cannot be treated with the necessary care; cracks and corners are left unclean; and the action of even the strongest disinfectants employed does not last long enough to insure sterility. Recent investigations have demonstrated that even a 1:1,000 sublimate solution requires thirty minutes of undisturbed action to destroy staphylococci with certainty.

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* Abstract from the "Zeitschrift für Hygiene und Infectionskrankheiten," Vol. XXIX., No. 2, December 9, 1898.

About a year ago I made some practical experiments in my institution to determine the value of the usual methods of house disinfection. Pus cocci and other disease germs were placed on carefully marked locations in the room and on the furniture, and the regular Municipal Disinfecting Corps was brought in. The disinfection was well done, for the room was small, had very little furniture in it, and the corps was carefully supervised. Twice was the experiment tried; and twice was it found that a considerable portion of the germs were left living. Silberschmidt ("Correspondenzblatt für Schweizer Aerzte," No. 7, 1898) reports similar results. Official Disinfectors, who have to do this uncongenial work in three or four rooms daily, will undoubtedly leave a still larger proportion of disease germs in the living state behind them when their work is done.

It is immediately fatal to any general method to admit its practical inefficiency. The authorities have done what they could, however, with the means at their disposal. No disinfection in any way practical will destroy all the disease germs. Some will remain in out-of-the-way corners, localities outside the sick room, or on the persons of the inhabitants of the house. The utmost that we can expect of disinfection is that it destroy the main masses of the disease-producing organisms in a simple and innocuous way. Our efforts must be directed toward the discovery of new methods and procedures which will increase the percentage of destruction. When we can destroy over 90 per cent. of the disease germs present in a room the dangers of infection become almost nothing, and we can be satisfied with the disinfection. This cannot, of course, be done with our previous methods; which does not, however, discredit them as partially successful and as the best that could be employed. We are ready to give them up as soon as the search for a more suitable method is indubitably successful.

Of late years our attention has been chiefly directed for this purpose to formaldehyde. After Aronson ("Berliner Klinische Wochenscrift," No. 30, 1892), Trillat ("Compt. Rend.," Vol. CXIV.) in 1892, and Hauser (Münchener Med. Wochenschrift," Nos. 30 and 35, 1893) in the following year called attention to the energetic disinfectant properties of formaldehyde, a multitude of authorities have experimented with it for the disinfection of dwellings, and most of them assert with emphasis that they regard it as the disinfectant of the future.

The idea of using a gas as the disinfectant is attractive for ob-

vious reasons. Chlorine, bromine and sulphurous acid have been employed for the purpose; but not with satisfactory results. Exact experimentation soon showed that an efficient disinfection could only be attained by using the gases in concentrations and quantities that irreparably damaged the contents of the room. Neither in penetration, nor in even distribution, nor in continuance of action did they fulfil our expectations. A gaseous disinfectant could not be successful until we were able to make an exact quantitative measurement and determination of its disinfectant action.

The lessons learned from chlorine and sulphurous acid were forgotten, however, when the germicide properties of the formaldehyde gas were first announced. It was lauded as the best house disinfectant without any knowledge of its required concentration, of its diffusive properties, of its depth of penetration, or of the time that it needed to develop its full germicide effect. When finally quantitative disinfection experiments were instituted, the results became worse the more exactly and completely the trials were carried out. Some experimenters were thus led to reject formaldehyde entirely.

The requisites of a practical gaseous disinfectant are:

1. It should be producible in a fixed and controllable concentration with ease and certainty, and such concentrations should be sufficient to destroy the disease germs with certainty within a definite time. Until very recently no such formaldehyde production was possible. The first lamps were arranged to produce the gas by the oxidation of methylated alcohol; but the amount obtained was much too small. Then it was endeavored to obtain it by heating the 40 per cent. solution of formaldehyde, Formalin, with the same result, since polymerization and the production of solid white paraform occurs when the concentration of the solution exceeds 40 per cent. There was no control of the concentration of the gas, no knowledge of the amount of aldehyde produced, no care taken to seal the orifices of the rooms.

The duration of a practical disinfection also must be relatively short. Dwelling rooms cannot be long vacated. To be practical and popular it must not take longer than one day or one night. Until quite recently an effective Formalin disinfection has taken from twenty-four to thirty-six hours.

2. A practically useful disinfectant must penetrate objects exposed to it to a certain extent; mere destruction of the superficially located disease germs is not enough. The formaldehyde disinfec-

tion is a superficial one. The gas cannot penetrate large masses of material, nor destroy germs with certainty when they are protected by layers of cloth.

3. The disinfectant must not damage the articles exposed to it, and it must not leave any smell behind which would interfere with the use of the room or anything in it after the process is over. Formaldehyde does not damage objects exposed to it, and no serious trouble is caused to human subjects by the gas. But it has an extremely penetrating odor, and irritates the mucosæ of the nose and eyes. And its odor is very persistent, in spite of airing the room.

4. The price of the disinfectant must be relatively small and the entire method not dearer than the previously used ones. This is not the case with formaldehyde.

Taken altogether, there seemed no sufficient reason to suppose that formaldehyde would revolutionize disinfection. But the manifest insufficiency of the older methods spurred us on to ever renewed attempts to eliminate the disadvantageous features of the ordinary formaldehyde process. And we have actually been enabled to formulate one for dwelling disinfection which is far perferable to those formerly employed. The experimental work necessary therefor, done at my institute with the assistance of Drs. Neisser, Laschtschenko and Poleck, has taken more than two years. The four conditions above demanded for a useful gaseous disinfectant are fulfilled in the manner hereunder detailed.

I. Preparation of the Necessary Concentration of Formaldehyde.

Not less than five different methods of evolving the gas may be employed, including those of Trillat, Rosenberg, Walter-Schlossmann and Schering. In the latter the solid polymerization product of formaldehyde, paraformaldehyde or trioxymethylene is used in the form of pastils of 1 gram (15 grains). These are vaporized over a spirit lamp in such a manner that the formaldehyde is produced mixed with the gaseous products of combustion.

As to the quantity of formaldehyde required to completely disinfect a specified cubic area, say 100 cbm. (3,500 cubic feet), that has been settled by numerous observers by experimentation with test objects. The figures vary a little occasionally, owing to differ-

ences in the nutrient media employed. Gelatin, in which the bacteria may easily seem to be dead, should always be supplemented by bouillon cultures at 37°C. (98.6° F.) of the same concentration. Accidental conditions, such as varying resisting powers of the test bacteria, degree of desiccation, thickness of the layer employed, etc., may also have influenced the results. In the Breslau Hygienic Institute we have used all the various methods.

Two other conditions are of importance in the comparative experiments as to the quantitative dosage of the formaldehyde. The first is the varying tightness with which different rooms are sealed. With equal production of aldehyde the concentration of the disinfectant in the air of the room may be quite insufficient if the ventilators, chimneys, etc., are left open or only partly closed, or if the windows and doors fit badly; while in a properly sealed room it may be quite enough. Equal conditions for comparative purposes can only be obtained by as complete a closure as possible of all the rooms to be disinfected. It was formerly doubted that this could be practically done; but we have gradually elaborated a simple yet perfect method, which will be detailed under the heading of "Instructions." The entire process takes about twenty minutes for a medium sized room. Numerous experiments have proved to me that rooms sealed by this method are equal as regards the amount of aldehyde per cubic meter (35 cubic feet) which must be developed to obtain a definite concentration.

Whereas, in the Schlossmann method, it is claimed that sealing of the room is unnecessary, the bactericide result is obtained by the development of a mass of formaldehyde four times greater than that required in the other methods. Two-thirds of it can be lost, and still enough remain. This not only increases the expensiveness of the process excessively, but intensifies the difficulty of removing the obnoxious odor after the disinfection. It is both wasteful and useless.

The second condition influencing the reaching of the required concentration is the degree of moisture in the air. Dry formaldehyde gas in dry air has but feeble disinfectant power. This is also the case with dry heat, chlorine and sulphurous acid gas, vaporized sublimate, etc. The objects must be moistened to a certain extent to permit the penetration of the disinfectant; and with formaldehyde abundant moisture is also required to prevent polymerization. Some of the Formalin disinfectant methods ignore these facts.

To secure uniform conditions in this respect also it is advisable

to always saturate the air of the room to be disinfected with steam, so that a slight condensation (but no wetting) takes place on its surfaces and contents. In some of the methods the water must be vaporized separately. The Schering factory has recently constructed an apparatus in which the steam production is combined with the vaporization of the pastils; a very practical arrangement. All the flat surfaces in the room are covered with water of condensation containing formaldehyde in solution, thus arranging the most favorable conditions for effective disinfection.

Warm stoves, or places in the walls warmed by chimneys present special difficulties; condensation does not occur on them, and test bacteria are not perfectly destroyed. Practically it is not likely that the disease germs will be located at just those spots; and where special care is required, as in an operating room, Formalin or sublimate washings must be employed.

These important conditions complied with, the room completely sealed and its air saturated with watery vapor, we found that for large, comparatively empty rooms 200 grams (200 Formalin pastils) of formaldehyde per 100 cbm. (3,500 cubic feet) was abundantly sufficient; smaller rooms with much furniture required at least 250 grams (250 pastils) per 100 cbm. (3,500 cubic feet). In practical disinfection it would be well to take the latter figure as the minimum basis of calculation. The concentration obtained by the use of this proportion invariably kills diphtheria bacilli, streptococci, resistant staphylococci, tubercle bacilli, anthrax spores of medium resistance on cloths soaked with bouillon culture, and the micro-organisms present in pus, sputum and membranes. It made no difference where the test objects were placed in the rooms, or even whether or not they were covered with a light layer of cloth. On the other hand there did not occur destruction in thick layers of sputum, in thick pieces of soaked cloth, or in closed drawers.

The time of action also is of importance for a normal concentration. Even slight concentrations can effect complete disinfection when they are allowed to act for from twenty-four to thirty-six hours. For practical work, however, the room must be habitable again in twelve hours; the class of people for whom the disinfection is chiefly designed cannot spare their rooms for longer. The preparations for the disinfection, and the clearing up to be done afterward take, as we shall see shortly, several hours; so that the time of action of the gas must not exceed six to eight hours. The concentration recommended above has been chosen because it kills

the disease germs in question within seven hours. The complete formula is therefore as follows:

For every 100 cbm. (3,500 cubic feet) of space, after careful sealing and saturation of the air with steam, 250 grams (250 pastils) of formaldehyde must be developed, to act for seven hours.

It would of course be possible to increase the amount of formaldehyde and further shorten the time of action. This may be useful in certain cases, as in small apartments, where the rooms cannot be long vacated. It is not advisable to carry this too far, as is done in Schlossmann's method. The difficulties of subsequent deodorization become greater with the increase of the amount of the gas, an important practical point; and the same can be said of the cost. Certain articles require special disinfection of at least three hours; a point to which I will return later. Double the above concentration, with half the time of action, is about the practical limit.

With the above precautions all the various methods of producing formaldehyde can be employed for the disinfection of rooms. The question is, which is the best for practical use? Here considerations of simplicity of process and apparatus, and smallness of cost enter into consideration. The Trillat apparatus is open to the objection that it is very dear, and that it is difficult to manage; besides this, for large rooms it has to stand outside for many hours, and requires the continuous presence of an operator to regulate the vaporization. The other apparatuses do not require this. The Rosenberg apparatus has been tried but little for large rooms, and the menthol and methyl alcohol seems to render the method unnecessarily dear. The Schering method is very enticing on account of its ready handling and dosage, and its easy and certain method of formaldehyde development. We have made most of our practical experiments with it; and we found that the disinfecting corps liked it so well and worked in so trustworthy a manner with it that we deemed any further modification of the method superfluous. Only the price of the pastils is relatively high. The Schlossmann method is the least recommendable. It is needlessly extravagant in material, and therefore in price; and the spray apparatuses are dear. It is obnoxious also in practice on account of the glycerin that is sprayed out, forming a greasy coat on everything in the room; and a very troublesome formaldehyde odor remains attached to everything exposed to it. Bedding and clothes cannot be used for a long time afterward. Finely polished articles of furniture become dull and spotted, and even permanent damage is done. The

Breslau method, in which diluted Formalin is vaporized in an ordinary kettle, appears to me to be the simplest.

II. Methods of Increasing the Penetrating Power of the Formaldehyde.

Formaldehyde gas does not penetrate far beyond the surface of the objects exposed to its influence. Certain diseases are unsuited for the method, among which we may mention cholera, typhoid fever, dysentery, puerperal fever, suppurations, erysipelas, sepsis, smallpox and the plague. These diseases are, however, only very exceptionally the subject of domestice disinfection, and for them boiling water, steam, the hot oven, sublimate, carbolic, chloride of lime, etc., are the proper disinfectants. In some of these diseases, however, a combined disinfection with steam for bedding, clothes, linen, and Formalin disinfection for the room and its contents is indicated. The records of our Disinfection Bureau show that it was especially for diphtheria (over 80 per cent. of all cases), scarlet fever, phthisis, measles and influenza that its aid was required. These form the mass of the disinfections; and our efforts must be directed toward making the Formalin disinfection sufficient for these cases, and avoiding the troublesome and unpopular process of removing the furniture from the house. The most important point is to secure the free exposure of all articles in the infected room to the gas.

Furniture must be removed from the walls, drawers and cupboards must be opened wide. Folding iron frames, which the disinfecting corps can bring with them, and wash-lines, will serve for hanging up all bedding, clothing, draperies, etc. All soiled linen and similar articles are immersed in a solution of sublimate. The entire preparations for disinfection, including the sealing of the room, take about one hour.

The objection may be made that in spite of these precautions disease germs may lurk in the depths of porous articles and in inaccessible corners of the room. This has little validity from a practical point of view. Many disease germs scattered around during sickness and convalesence undoubtedly do escape our disinfection; but this should not be allowed to discredit the best available measures for general and popular use.

III. Removal of the Formaldehyde from the Disinfected Room.

For this purpose the mere airing of the room is not sufficient. Large quantities of the gas may get into adjacent halls, stairways and rooms, and be very troublesome to the inhabitants of the house. Exposure of the disinfected surfaces to the outside air cools them, and causes the aldehyde to penetrate them more deeply; and it takes a long time before the odor of the gas gradually disappears. The development of ammonia gas while the room is being aired is also insufficient. Theoretically the ammonia should form a solid, odorless body, hexamethylentetramine by combination with the formaldehyde.

The results are different, however, when the ammonia was developed in the room immediately after the disinfection, and while the space was still filled with the disinfectant gas. It becomes entirely combined, and the excess of ammonia is readily removed by ventilation.

We have found the vaporization of the commercial 25 per cent. ammonia solution to be the best method of obtaining the gas. It is placed in a tightly closed iron vessel with a spout to be connected with a rubber tube that has been inserted into the keyhole of the outer door of the room before it is sealed. Attached to the end of the tube inside the door is a small receptacle to catch any drops of ammonia that may appear there.

The amount of ammonia gas developed must correspond to the amount of formaldehyde present, or rather, be in excess of that quantity. Four molecules of ammonia unite with six molecules of formaldehyde to form hexamethylentetramine. Therefore for every 100 cbm. (3,500 cubic feet) of air space in which 250 grams (8⅓ ounces) of formaldehyde has been developed, or 660 ccm. (20 ounces) of liquid Formalin vaporized, there is required the evaporation of 800 ccm. (27 ounces) of the 25 per cent. ammonia solution. A double concentration of the formaldehyde requires increase of the ammonia one and a half times only. The vaporization is effected outside the room, and requires for the above amount about twenty minutes of time. Half an hour should then be allowed to elapse, to permit the diffusion of the ammonia and its combination with the formaldehyde to become complete. Then the room can be aired, the furniture replaced, and the articles of clothing and bedding put away. The room can be used, even as a

bedroom, at once. The entire time required for the ammonia development, airing and setting the room to rights is about an hour.

IV. Cost of the Formalin Disinfection.

This depends in the first place on the price of the apparatus required for developing the gas. It is very much less with the Schering disinfector than with any of the others, especially the complicated Trillat apparatus. The blue enameled Schering apparatus costs $4; a steam generator and 250 pastils for 100 cbm. (3,500 cubic feet) of air space would be $1.75. The expense of the ammonia, alcohol, material for sealing the room, etc., is trifling. The entire cost compares favorably with that of the older methods.

I would not venture to recommend the routine to be detailed below if I had not had an opportunity to test it in practical work. Introduced as the municipal disinfection method in Breslau for a time, it was employed in 120 disinfections with excellent results in every respect. The public has been satisfied with it, since no articles had to be removed from the houses, and no damage was done to property. The disinfecting corps was enthusiastic for it, and were especially glad to be released from their former "scrub-woman" work. They learned the technique very quickly and were of the opinion that with a little care mistakes and unsuccessful disinfections should not occur.

More important than this, however, is the fact that, in contrast to the former methods, we have felt satisfied that the disinfection has been thorough. It is extremely unlikely that any disease germs will retain life and virulence after a Formalin disinfection performed strictly according to rule. Practical house disinfection has taken an important step in advance, and is as perfect as the means at our disposal permit it to be.

Instructions for Formaldehyde Disinfection.

Formalin disinfection alone is suitable for diphtheria, scarlet fever, measles, tuberculosis and influenza.

Puerperal fever and other septic diseases (as well as hospital wards, operating rooms, etc.), with smallpox and the plague, require Formalin disinfection plus steam disinfection of the mattresses and bedding.

Cholera, typhoid fever and dysentery require steam and chemical disinfection of the articles liable to carry the contagion.

The following articles are needed for the disinfection of rooms containing 200 cbm. (7,000 cubic feet) of air space:

1. Cotton and strips of sheet lint.
2. Putty and a putty knife.
3. Wrapping paper, starch paste, rule, scissors and pins.
4. A clothes-horse and some wash line.
5. Two large tin pails, insides varnished.
6. Four towels.
7. Alcohol, ammonia (25 per cent.), sublimate and ordinary salt.
8. An ammonia developer with alcohol lamp and tubing.
9. Gowns and caps for the disinfectors.
10. Two Formalin disinfectors.
11. Five hundred 1 gram Formalin pastils.
12. Two steam generators.

Plants and living animals are to be removed from the room. Sublimate solutions are prepared in the tin pails. All the bedding and dirty wash is placed in them, and all noticeably dirty places on the floor and walls are well wetted with the solution. The bedstead and other furniture is removed from the walls, cupboards and drawers are thrown wide open, and all ornaments, books, etc., are stood or hung up in such a manner as to give the gas free access to them.

Mattresses, table cloths, clothes, rugs, etc., are hung up on the clothes-horse or the wash lines in the middle of the room, each separately and unfolded. Pockets are to be turned inside out and pocket handkerchiefs are to go into the sublimate solution.

The cracks of the windows and doors are then carefully stuffed with strips of lint that have been soaked in the sublimate solution and wrung out. Cracks in the glass of the windows and wood of the doors are to be closed with putty. The keyholes are to be stuffed, with the exception of the one in the outer door. Ventilators, registers, the holes for electric and bell wires, speaking tubes, etc., are to be closed up with putty or wrapping paper. A tin tube is fastened in the keyhole of the outer door. The entire success of the disinfection depends largely upon the care with which the sealing up is accomplished.

For every cubic metre (35 cubic feet) of the room area 2½ Formalin pastils are to be employed. If more than 250 of them are needed, two disinfectors must be used. The steam generator, with 3 litres (3 quarts) of water and 1 litre (1 quart) of alcohol, is lit;

one of these generators is to be employed for each 100 cbm. (3,500 cubic feet) of cubic space.

The disinfectors are then lit. The spirit lamps under them are to be nearly filled, and the wicks are not to project more than 1 mm. (1-25 inch) above the tops of the tubes surrounding them. The pastils are then placed in the containers.

The apparatuses are to be so placed that the outer door of the room can be freely opened; and, to exclude all danger from fire, a free space of at least ½ a metre (20 inches) should be left around the disinfectors on all sides.

Before leaving the room the disinfectors take off their gowns and hang them up in the room and wash their face, beard and hands with sublimate solution. Then the outer door is sealed from the outside with strips of lint and paste. A wet towel can be laid in front of the lower edge of the door.

In seven as a minimum, or when double quantities of formaldehyde are employed, in three and a half hours, the ammonia development is begun. Eight ccm. (¼ ounce) are required for each 1 cbm. (35 cubic feet) of space; where double the amount of formaldehyde is developed 12 ccm. (⅜ ounce) are needed. The stopper is taken out of the outer end of the tin tube projecting through the keyhole of the outer door and the spout of the ammonia developer connected with it by rubber tubing. For the complete vaporization of the ammonia 100 to 150 ccm. (3⅓ to 5 ounces) of alcohol are required.

One hour after lighting the ammonia developer the room is to be entered, the windows opened, the articles in the sublimate solution washed and the apparatus removed.

ADDENDUM.

Report on some of the experiments made by Dr. Neisser on formaldehyde disinfection by the Schering process made at the Hygienic Institute of Breslau University, under the direction of Professor Flügge.

(Abstracted from "Zeitschrift für Hygiene und Infectionskrankheiten, Vol. XXIX., No. 2, 1898.)

In all seventeen series of experiments were made with the Schering disinfector. The first seven series were made with the test material dried or moist upon pieces of cloth and sown on agar or glycerin-agar test-plates. The endeavor was made to ascertain the

time limit of effective disinfection, as well as the effect of position. Ammonia was always developed after the disinfection, so that special washing of the test objects with solutions of the gas was not considered necessary.

The results as a whole were satisfactory; the disinfection failed only in places where the tests were not placed superficially enough.

One of the series was the following: A thin stool, sterilized, was mixed with typhoid bacilli and spread out in a fairly thin layer. Two pieces of coarse linen were soaked with staphylococcus pyogenes aureus, dried, and covered with pus containing streptococci. Six pieces of linen were soaked with diphtheria culture, dried, and put in various places. The same was done with staphylococcus culture. Finally two specimens of tubercular sputum were used; but the inoculated animals died in two days, and the experiments were useless.

The control experiments in all cases gave positive results.

All the disinfected tests remained sterile, with the exception of three samples of staphylococci, which had been placed in sheltered situations.

The time of the disinfections was seven and a half hours.

In another series of experiments the tests were not sown on plate cultures after the disinfection, but in bouillon. To remove any possible remnants of Formalin or ammonia the tests were washed in another sterilized bouillon tube before inoculation, both bouillon tubes placed in the culture oven, and observed, as a rule, until the fourth day. When the bouillon became cloudy its cause was determined by further inoculation and culture. In this series special attention was paid to conditions of temperature and moisture.

The tests consisted of pieces of linen soaked in watery infusions of staphylococcus-agar, diphtheria-serum, staphylococcus-bouillon and diphtheria-bouillon cultures. They were regularly placed at just under the ceiling, at the height of the table, and on the floor, and had all been dried for at least twenty-four hours in the exsiccator. Later on many variations were made in the kind, age and virulence of the bacteria tried.

It was soon apparent by this method of bouillon investigation that some of the test objects, a little more often when they were placed low in the room, were not completely disinfected. The special sample of staphylococcus pyogenes aureus employed was known to have an enormous resistance to sublimate and great pathogenic power for both man and animals, and was much more resistant than the diphtheria bacillus.

The following will serve as an example of the results:

Room area.....95 cbm. (3,325 cubic feet)
Temperature.....20.2° C. (68.4° F.)
Relative moisture.....59 per cent.

Tests: Staphylococcus pyogenes aureus, bouillon culture.
Staphylococcus pyogenes aureus, agar culture.
Diphtheria bacillus, bouillon culture.
Diphtheria bacillus, serum culture.

One specimen of each was placed just below the ceiling and one on the floor. Of these eight tests five remained sterile.

Not completely sterilized were:
Staphylococcus pyogenes aureus from bouillon, on the floor.
Staphylococcus pyogenes aureus from bouillon, under the ceiling.
Diphtheria bacillus from bouillon, under the ceiling.

It gradually became apparent that increasing the amount of moisture in the air of the room improved the disinfection and in the last series of experiments the air was always saturated with moisture by means of steam. A special series of experiments taught us that in a sealed room of 100 cbm. (3,500 cubic feet) size about 3 litres (3 quarts) could be vaporized to advantage even when the temperature was high; the hygrometer usually stood at between 85 and 90 per cent. This degree of moisture, with the condensation which is invariably and amply produced thereby on the surfaces, is sufficient to obtain a reliable disinfectant action.

Only the above mentioned resistant staphylococcus pyogenes was not always destroyed in every test object. It was placed, however, in the more inaccessible locations; and five other specimens of the same organism showed a resistance superior to that of anthrax spores. As an example of the last series of experiments I will adduce:

Room area.....70 cbm. (2,450 cubic feet)
140 pastils and 2¼ litres (2¼ quarts) of vaporized water

Time: Seven hours after lighting the lamp.

Tests: One under the ceiling, one at the height of the table and one on the floor.

(*a*). Pieces of linen soaked in
Diphtheria bacilli from bouillon.
Diphtheria bacilli from serum cultures.
Staphylococcus pyogenes aureus from bouillon.
Staphylococcus pyogenes aureus from agar cultures.
Streptococci from bouillon.
Pus containing streptococci.
Besides this, five pieces of linen soaked with five different varieties of staphylococcus pyogenes aureus, agar cultures, were placed at table height.

(*b*). Cover glasses with diphtheria bacilli, serum culture; and another pus, also containing streptococci.

(*c*). Threads containing anthrax spores of medium resistance.

(*d*). Applicators with pledgets of cotton, sent to the diphtheria office of the institute for examination, and containing abundant diphtheria bacilli.

All the control cultures showed abundant growth after thirty-six hours.

The results of the experiments were that all the test objects were killed, with the exception of the above mentioned specially resistant staphylococcus pyogenes aureus, two tests of which, from agar, escaped destruction.

These were the only non-sterilized ones out of thirty-five tests.

Two experiments were further made with tubercle bacilli, for which two sputa, one richly and the other superabundantly supplied with bacilli, were employed. The sputum was spread on cloths, dried, and used partly fresh and partly when older. The pieces were again placed at various heights of the room. After the disinfection the pieces were sown into pockets in the skin of the backs of guinea-pigs. After seven to eight weeks the animals were killed.

Of four control animals three were found tuberculous when killed; probably the piece of cloth came out too soon in the healthy animal.

Not one of the eight guinea-pigs showed any tuberculous changes, either at the site of inoculation, in the inguinal glands, or in the internal organs.

UNWHOLESOMENESS OF CHEMICALLY PURE WATER.

The "Deutsche Medicinische Wochenschrift," 1898, No. 39, contains an interesting report by Dr. Koppe, a celebrated German chemist, on the properties of chemically pure water, from which we abstract the following:

By "chemically pure water" we usually understand perfectly fresh, distilled water, whose behavior and properties are well understood. It withdraws the salts from the animal tissues and causes the latter to swell or inflate. Isolated living organic elements, cells and all unicellular organisms are destroyed in distilled water—they die, since they become engorged therein. They lose the faculty, upon which life depends, of retaining their salts and other soluble cell constituents, and consequently these are allowed to diffuse throughout the water.

Distilled water is, therefore, a dangerous protoplasmic poison. The same poisonous effects must occur whenever distilled water is drank. The sense of taste is the first to protest against the use of this substance. A mouthful of distilled water, taken by inadvertence, will be spit out regularly. The water once in the stomach, the superficial stratum of epithelium experiences a powerful distension, the cells are leached by their salts, die and are cast off. This local poisonous effect of distilled water makes itself known by a sensation of uneasiness, belching, etc., furnishing all the symptoms of a catarrh of the stomach on a small scale.

The harmfulness of the process so much resorted to to-day of washing out the stomach with distilled water is acknowledged, and we find the physicians who formerly used that agent are now turning to the "physiological solution of cooking salt," or "water with a little salt," or the mineral waters recommended for the purpose. The poisonous nature of absolutely pure water would surely have been recognized and felt long since were it not that its effects in their most marked form can seldom occur, for through a train of circumstances "absolutely pure" water can rarely be found. The ordinary distilled water, even when freshly distilled, is not really absolutely pure, while that used in the laboratories and clinics is generally stale, has been kept standing in open vessels, generally in

rooms where chemicals of every sort abound and whose gases and effluvia are taken up by the water.

The relative purity of samples of distilled water is best determined by the electrical conducting power of each, since this latter rises regularly and uniformly with the increased impurity of the sample. The purest water has but a small conductive power, since water is readily decomposed into hydrogen and hydroxyl (H and OH). To illustrate this fact, let us examine some investigations of Oswald and Koppe (the author), in which the numerals represent Ohms multiplied by 10^{10}.

Oswald used in his physical work water with the conductive index of 2.13. A similar water was obtained by Kohlrausch and Heidweiller by melting natural ice.

Koppe obtained by melting natural ice a water with 8 as an index of conductivity. Ordinary distilled water gave 49.2, and ice prepared from distilled water which had been boiled gave, on melting, one with the index 10. The following are the indices of certain well-known waters:

Gasteiner Giftbrunnen ("poison springs")	31.9
Water from artificial ice	137
Vienna, public mains	220 to 239
Giessen, public mains	296
Selterswater, natural	5.700
Salt, solution 0.73 per cent	11.050
Salf, solution 1.46 per cent	20.038

"Water melted from natural ice," proceeds Koppe, "was purer than even boiled distilled water. Our patients are delighted when we get for their use this transparent and brilliant ice, and we (as physicians) think that surely nothing can be safer than water melted therefrom—but many a belch comes from the stomach of the patient allowed to hold a bit of the ice in his mouth and swallow the water. If this process is permitted for any length of time we hear complaints of 'weak stomach,' 'catarrh of the stomach,' etc., which we must charge up—solely to the purity of the water!

"And here it is all the worse. In the mouthful of 'pure water' taken inadvertently in the laboratory, as stated, the sense of taste comes to our rescue, and we spit it out, but here the sense of taste is benumbed by the cold."

This explanation seems to be all the more reasonable when patients with hitherto perfectly healthy stomachs, who, after operations, are for any reason allowed to swallow "ice pills," begin to belch, and not infrequently contract catarrh of the stomach. There are well-known sequelae of the use of ice, but up to the present no reasonable hypothesis has been offered as to the etiology of the same. It has been charged, it is true, to the "bacteriological contents" of the ice, but examination of the latter has demonstrated it to be almost free from bacteria such as would account for the phenomena, though otherwise frequently containing bacteria. As a remedy our clinicians say we must use only artificial ice, made from distilled water. Well, it is possible that artificial ice may be better borne than the natural, but it is not because it is purer than the latter, but exactly the contrary. It is simply because the melted water thereof more closely approaches our ordinary drinking water.

This point in the care of the sick, which is certainly worthy of investigation and explanation, finds its analogy in the daily experiences of the traveler in the high mountainous regions (die Hochgebirge). The guide books warn him against quenching his thirst with snow and glazier water and the waters of the mountain brooks as well, for, as is well known, these not only do not quench the thirst, but give rise to much discomfort. With the greatest probability of being correct, we may assume that snow and glazier water are of the highest degree of purity, approaching distilled water very closely, or, indeed, excelling it in purity (see the index of electrical conductivity of the Gasteiner Asche above—only 31.8, even less than the ordinary distilled water. The index of the Housbrunnen in the Kurhaus at Provencheres in Gastein is only 36.1).

The harmfulness of glazier water, like that of the pure, cold mountain brooks, most of which, indeed, spring from glaziers, arises from the fact that they are exceedingly pure waters and produce identically the effect of the use of distilled water—they are poisonous. The supposition that the coldness of the water causes the sick, uneasy feelings cannot stand for a moment, though this coldness is very probably the reason that its unfitness for use is not at once recognized and the liquid rejected.

The last link in our chain of prolegomena is found in the case of another of the Gastein springs. The water of this spring has an electrical conductivity of 31.9, therefore far excelling ordinary

distilled water in this respect, and hence, according to our proposition, its use should demonstrate the poisonous nature of pure water. By a most strange coincidence, from the oldest times, for hundreds and hundreds of years, this spring has been known as the Giftbrunnen—the "poison spring." Its water is never drank, it is commonly regarded as poisonous, although no chemical examination of it—and they are almost innumerable—has yet been able to detect the slightest trace of any poisonous substance. Its poison lies in the fact of its extreme purity! This, we know, is a proposition that nobody will take in earnest—still, it is devoid of anything wonderful in a physiological point of view, and, furthermore, it is borne out by fact.

THE LOUISIANA LEPER HOME.

The Leper Home is admirably situated. It covers 200 acres of an old plantation in Iberville parish, on the Mississippi, seven miles from a railroad and two miles from Whitecastle, on the opposite side of the river. The lepers are confined within a high stockade surrounding a space of 15 acres. Within the stockade are seven houses occupied by the lepers, an elevated pavilion or lookout for their amusement, and a splendid grove of live oaks. On the other side of a fence in the direction of the main plantation buildings is a long raised cottage, especially constructed for the lepers' dining hall, kitchen and other offices. No one is allowed inside the inner leper stockade except the doctor, the nurses and the members of the Board of Control.

The home is admirably managed in all respects, and the greatest care is taken to prevent any spread of the disease. All money handled by the lepers is soaked in bichloride of mercury solution and fumigated with the strongest disinfectants. The site is healthful and isolated. There is an old-time plantation mansion, an immense brick building, which is only half occupied by the Sisters of Charity, who do the nursing, and other employees, and there are accommodations on the place for five times as many lepers as are there; indeed, when the plantation was leased, it was with the idea that the act of 1892, requiring the confinement of all lepers in the home, would be rigidly enforced. The home is somewhat expensive, and the State is paying some $300 a year for the support of each inmate.

The home was established in 1892, when Louisiana seemed to be aroused to the importance of dealing with the problem of leprosy. It had previously been regarded as a subject to be avoided, the mere mention of which was thought to be prejudicial to the interests of the State. For more than a century since Carondelet's régime under the Spanish domination the leper question had been ignored, and it was agreed not to recognize the existence of the disease. But, in 1892, owing to the unpleasant publicity that had been given the disease, through the discovery of a leper barber and a leper baker, the necessity of action was recognized by all. The Legislature provided for a home, but unfortunately appropriated only enough money to lease one, not enough to buy one, and passed an act which provided penalties for harboring lepers and required sheriffs to deliver such unfortunates to the home when so ordered by the district judge. The first idea was to establish the home in the outskirts of New Orleans, where better medical attendance could be provided; but the city protested so loudly that this plan was abandoned. The Board of Control kept its subsequent plans secret to prevent similar protests from the parishes, and it was not until the Indian Camp plantation had been leased that the location determined on was made known.

But the lease of the property will expire in a short time, and the State will again be brought face to face with the question of what to do with the lepers. Drastic measures, such as have been adopted in Hawaii and other countries where leprosy prevails, would, it is believed, have routed it from the State long ago. As it is, leprosy has lingered in Louisiana for a century and a quarter.

Unfortunately, the law of 1892 has been allowed to fall into desuetude, and there are more lepers outside the home than in it. This is due partly to the concealment of lepers, and to the unwillingness of the sheriffs to arrest them. The Board of Control itself has not heretofore insisted on the compulsory confinement of lepers, preferring that they should voluntarily go to the home, and should be attracted by the fact that they would be more comfortable in the institution than on the outside, where they are avoided by every one. The home is certainly comfortable. The lepers are well cared for, well fed, well clothed. They suffer a great deal from cold, for when it once reaches their bones, it seems impossible to warm them up by any fire. Otherwise they are well satisfied, and only one leper has escaped, a young man, who ran off to go to the Hawaiian Islands, where he thought there were better

chances for a leper to make headway than in Louisiana. One chief reason why many lepers refuse to enter the home is that it is not permanent. Lepers are timid, and their relatives want to know all about the home before placing members of their families there; and when they find that the home is merely leased and that there will have to be a removal this year they refuse to take advantage of the accommodations the State offers.

The Board of Control, after allowing the law as to the confinement of lepers to remain unenforced, has finally come to the conclusion that something should be done in regard to lepers whose relatives are able to care for them. These, the board declares, can be reached only through their family physicians, and it is proposed to compel the latter to report the real names and residences of all lepers within their knowledge and practice to the Board of Health or designated officials, who shall decide the question of their removal to the home. As for those lepers whose necessities require them to mingle with the people in order to support themselves and their families, the board insists that they should be confined at once. One of the pledges that the board makes is that the real names of the lepers shall never be made known, nor shall any inquiry be conducted into their family connections. A pledge of this kind is absolutely necessary. The fact that a leper is connected with a Louisiana family is certain to affect that family. This is owing to the belief that the disease may skip a generation or so, and break out at any time in the descendants of a family afflicted with the malady.

While the home has cared for the lepers well and has made them more comfortable and prolonged their lives, it cannot be said that it has accomplished anything in the way of treating or curing the disease, although every remedy has been tried.

Recent investigations have shown that the disease is certainly infectious, though under such limitations as to be subject to preventive measures. And such has been the experience of this home —not a case nor a suspicion of a case can be traced to the Indian Camp Home. The institution was established, however, more for the protection of the community against the malady than with any belief that a cure could be found for it.

Investigation, conducted mainly by Dr. Isadore Dyer, first President of the Louisiana Leper Board, shows that the disease was brought into Louisiana in 1756 by the Acadians, Evangeline's people. It is well known that leprosy has prevailed for a couple of cen-

turies in Acadia (Nova Scotia), but it had been generally thought that the Louisiana leprosy came from the East. It is now beyond question that it was brought in by the Acadians in 1756, and reinforced by the larger Acadian immigration of 1776. There were a large number of lepers among the new arrivals, who exposed their sores and begged on the streets, so arousing popular sentiment that a leper hospital was erected in 1785 by Don Andres Almonaster, who built the St. Louis Cathedral, the Charity Hospital and other public buildings, and was the richest man in the colony. This hospital was on Metairie Ridge, in the immediate rear of Reed avenue, the neighboring country being known as "leper's land." This hospital greatly reduced the amount of leprosy, and if the vigorous policy then pursued of confining all lepers within it had been continued the disease would have been rooted out of Louisiana.

From 1807 to 1879 little was heard of leprosy in Louisiana, although it existed. It was generally confined to a few families and to remote localities, especially the swamp along the lower Lafourche. About 1879 the disease attracted attention again when seven cases were reported. The doctors began an examination and reported eighty-three cases in all, a number of them in the immediate vicinity of the old leper hospital, closed seventy-two years before. Most of the patients were of foreign birth or parentage. Of these lepers only ten were confined in the pest house. The agitation aroused the Legislature, and the result was the legislation of 1892.

Altogether, Dr. Dyer found evidence of 277 cases of leprosy in Louisiana, of which 131 are presumably living. None of the cases was imported, the patients having been born in Louisiana or having acquired leprosy after removal here. Nor could any cases of heredity be found, contrary to the popular belief. When so-called family leprosy occurs it is manifested after the age of 5 or 6, and oftener in adults. There were twenty-one instances of consanguinity, many with a history of contact; forty-five instances of parents and children afflicted, but no instance in which either parent was affected before the birth of a child, and sixty-one instances of constant exposure to contact. In six cases both husband and wife were lepers; in twenty-seven, brothers and sisters; in twenty-six, parents and children. One of the cases was that of a priest, an Italian, infected while ministering to the lepers of the lower Lafourche, and another that of a nurse who had waited on the leper sick.

The Board of Control in its report to Gov. Foster makes an earnest demand for energetic and vigorous action, the purchase of grounds for the lepers and the confinement of all lepers in a home. If this be done it is the opinion of all experts that the disease can be got rid of in Louisiana in a very short time; but action should be taken at once, as the lease of the present home expires this year.

It is thought to be impossible to secure a renewal of the lease because of public prejudice in Iberville parish, where the home is situated, and the bitter opposition of the neighboring prosperous town of Whitecastle. The same opposition will be encountered in other parishes where the State may try to establish a home for lepers. The board has frequently called the attention of the Legislature to the matter, pointing out that the State ought to purchase property for a home and not depend upon a lease; but the Legislature has always dodged the unpleasant question. Whether the failure of the State to act will result in turning the lepers lose on the community, or whether they will remain where they are until they can be removed elsewhere, cannot now be determined. No one is likely to venture on the place to remove them as trespassers. It is possible that they will find another home through the charity of friends, for they have received many gifts and legacies from all parts of the country, and there is an auxiliary association of women in New Orelans who look after and care for these unfortunate people.

INSANITY IN SWITZERLAND.*

By Adolph L. Frankenthal, U. S. Consul.

Out of a population of a little over 3,000,000, Switzerland is a record breaker as regards insanity. According to enumeration at the close of the year 1897, the inmates of the twenty State insane asylums of the Republic numbered 6,164, against 5,933 in 1896. The number of females predominated—3,262, against 2,902 males.

The commitments to the asylums during the year 1897 are recorded as follows: Males, 1,350; females, 1,050; total, 2,400. Released during the year, 1,247 males and 922 females; found not insane after commitment, 15.

* Consular Reports, No. 221.

The expenditure of the State for the keeping of each person is given as about 250 francs ($48.25) per annum.

There are no laws for the commitment of insane persons. No judicial proceedings, such as a trial before a competent court or expert commission, are followed; but simply the written assertion of an ordinary physician, who need not be a specialist on insanity, that in his belief the person is insane, is deemed sufficient for the seizure and confinement of such an accused person in an asylum.

The following case will illustrate what can happen to an American citizen in Switzerland:

Julius Gerber, born in Switzerland in 1864, emigrated to the United States in 1879. In 1898, having saved enough money to gratify his desire of visiting his birthplace, he took passage from New York. Unfortunately, he was robbed of his savings on the steamer and arrived in Switzerland in a destitute condition. The Swiss law proclaims "Once a Swiss citizen, always a Swiss citizen," in spite of the fact of a native's prolonged absence in another country and of his swearing allegiance to and becoming a citizen thereof, thus making a peculiar duality of citizenship. The knowledge of this law of his native country induced Gerber to apply for admission to a labor colony, a kind of public workhouse, in this city. The work he was put to was hard, while the food, so he told me, was entirely insufficient. His hope of getting back to the United States and his continuous harping thereon earned for him the name of a homesick melancholiac, and he was sent for mental examination to a hospital.

A physician, not an authority on insanity, gave a certificate declaring Gerber insane. While in the hospital and awaiting transportation to one of the insane asylums, Gerber escaped to the consulate and asked protection as an American citizen. At my suggestion, he agreed to return to the hospital for further observation, where he was at liberty to go about as he pleased. In his conversations with me, no traces of insanity or hallucinations were discernible—simply a reiteration in a most natural manner of wanting to return to the United States, where he could get work to which he was accustomed.

After several interviews with the authorities, I proposed to pay half of his fare to the United States, provided they would pay the other half. This they at last agreed to do. The same physician who so willingly made out a certificate declaring Gerber insane was equally ready a week later to give me another pronouncing

"the man's mental and physical condition such that, without danger to himself or others, he could travel in safety." Gerber left, cheerful and contented, on October 29, for the United States. By the expenditure of a small sum and a little time the man has been saved from a fate worse than death.

BERNE, October 31, 1898.

LIFE.

Silently, swiftly, one by one
We march down the aisles of time;
Musical murmur and mournful moan,
Plaintive pleading and tender tone,
Blend in a living rhyme.

Hope and happiness, faith and fame,
All are swept along
Into a future misty and gray,
Peopled with phantoms grim and gay,
Some with a curse and some with a song.

Lives that were full of happiness,
Others that teemed with sin;
Shadowy phantoms of bygone days
On a suffering soul turn full their gaze,
And we long for the "Might have been."

But the longing is vain, for the past is dead,
And a passing present is all we know.
Futurity's riddle we may not read,
But the pains of the past with its lust and greed
Should tell us the way to go.

Prince and pauper are peers in death,
Their ashes are blown where their feet once trod,
Out of the past with its weal and woe
Into the future of doubt we go,
Christian and pagan to face one God!

—"The Denver News."

MEDICAL EXCERPT.

By T. P. CORBALLY, A. M., M. D.

BRONCHO-PNEUMONIA.

This disease, says Dr. H. Gillet ("La France Medicale," March 17, 1899), is most frequently a secondary infection engrafted on some other infection as a primary cause; technically a local trouble, its influence extends throughout the whole organism. The danger arising from it, except in case of generalized congestive action, is less felt in the lungs than in the heart, the kidneys, the liver or the nervous system. This idea of generalized infection independent of its pulmonary location should guide the treatment.

And first, the prophylactic measures. Two things must be strictly observed: isolation and disinfection. Every child attacked with broncho-pneumonia must be kept perfectly isolated from every other child, whether healthy or sick. During the continuance of the disease, everything that the child touches, and everything and every one that touches it, as well as everything that is given off from it, must be thoroughly disinfected.

After the disease, local disinfection must be rigidly enforced, and these measures must be followed with even greater rigor if many children in the same locality have been infected.

To prevent broncho-pneumonia from spreading, antiseptics of the nasal fossal and of the throat must be systematically performed. For the nose, inject into both nostrils a 10 per cent. solution of mentholized oil; irrigation with boracic, or similar preparations, are liable to carry the infection to the eustachian tubes, and thus possibly to the sheath of the tympanum.

For applications to the throat as gargles and sprays, an antiseptic solution must be chosen of moderate strength, and always adapted to the age of the patient, who may not always be able to avoid swallowing the whole or some part of the liquid.

As soon as the nature of the disease is clearly known the treatment should be commenced. The only rational treatment is an anti-streptococcic serum, at least for cases of broncho-pneumonia of streptococcic origin, which are of most frequent occurrence,

Thus far the results of general treatment have not been satisfactory.

In the absence of serum, it is necessary, in combating the disease, to attack not only the pulmonary trouble, but to strengthen the condition of the whole system.

For the thorax, revulsion in the form of dry cups, many and repeated if necessary; even wet cups in extreme cases. *No blisters.* Enveloping the chest in wet compresses covered with oiled tissue and compresses, frequently renewed; sometimes mustard applications, covered with sheet wadding.

For attacks of congestion, hydrochlorate of ammonia and quinine as vaso-constrictors.

Besides these specific prescriptions, everything should be done to improve the general condition, and special care be taken to strengthen the action of the heart, the kidneys, the liver and the nervous system. No depressing remedies should be used, as antipyrine nor aconite, in particular, not even ipecac; the first closes the kidneys, the second depresses the nervous system and the third weakens the heart.

Remove unnecessary furniture from the room of the patient and exclude all whose services are not necessary; cleanliness must be observed without causing dust; use moist brooms or cloths or damp sawdust.

Admit pure air freely, but prevent a current on the bed of the patient. If necessary, impregnate the air with antiseptic vapors: eucalyptus, thymol, creosote, etc. If circumstances permit, have a room for the day and one for the night. Oxygen to be inhaled in case of asphyxia.

The complete function of the kidneys must be maintained by the copious use of drinks, water or tea and coffee, as already mentioned; to these may be added orangeade, syrups with vegetable acids, and especially milk.

In the administration of purgatives, the mild chloride is to be preferred; 5 centigrams for a child one year old, and 5 centigrams additional for each year of the child, will secure a relative intestinal antisepsis which will aid the kidneys and enable the liver to fulfil its role as a destroyer of toxines; and a little ether, in the form of syrup of ether, will maintain the glycogenic function in good condition. The benzoate of soda will diminish the toxicity of extractive matter. The nervous system will be benefited to a certain extent by the cardiac tonics and the hydrotherapeutic measures.

Special care must be taken to sustain the system with diffusive stimulants, as ammoniacal salts, either carbonate or acetate. Injections of ether, camphorated oil, saline solutions for grave cases.

Alcoholic stimulants have been recommended; except in special conditions they are injurious and should never be prescribed: their action on the liver and kidneys is bad; they are already acting imperfectly.

OTITIS.—"The more I see (Dr. Hugh Blake Williams, of Chicago, 'The Alkaloid Clinic,' January, 1899) of chronic suppurative inflammation of the ear, the more convinced do I become that the element of chronicity is due to lack of thoroughness in treatment. The method of procedure mapped out below will not succeed in cases where necrosis has occurred, but in all others it will reduce the duration of treatment from months and weeks to days.

"The patient is placed upon the side with the affected ear up. The concha is filled with Marchand's Hydrozone, which is allowed to remain until it becomes heated by contact with the skin, when, by tilting the auricle, the fluid is poured gently into the external canal. The froth resulting from the effervescence is removed with absorbent cotton from time to time and more Hydrozone added. This is kept up until *all* bubbling ceases. The patient will hear the noise even after the effervescence ceases to be visible to the eye.

Closing the external canal by gentle pressure upon the tragus forces the fluid well into the middle ear, and in some instances will carry it through the eustachian tube into the throat. When effervescence has ceased the canal should be dried with absorbent cotton twisted on a probe and a small amount of pulverized boracic acid insufflated.

"The time necessary for the thorough cleansing of a suppurating ear will vary from a few minutes to above an hour, but if done with the proper care it does not have to be repeated in many cases. However, the patient should be seen daily and the Hydrozone used until the desired result is obtained.

"Care is necessary in opening the bottle for the first time, as bits of glass may fly. Wrap a cloth about the cork and twist it out by pulling on each side successively.

"In children and some adults the Hydrozone causes pain, which can be obviated by previously instilling a few drops of a warm solution of cocaine hydrochloride. In this note it has been the intention to treat suppuration of the ear rather as a symptom and from the standpoint of the general practitioner."

THE AVAILABLENESS OF LISTERNE.—"There are thousands of physicians—yes, tens of thousands, we doubt not—who can say with "Doctor," in "An Interview" ("Massachusetts Medical Journal"), "Why, I absolutely depend upon Listerine in most of my throat work, and find it of inestimable value in my typhoid cases (as many a poor soldier boy can testify), and there are a number of purposes I put it to in the sick room, where nothing can take its place, notably, as a douche, mouth-wash, and in sponging my fever patients. Furthermore, I always deem it my duty to see that my patients get exactly what I order for them; therefore I always order an original package, thus avoiding all substitutes. That is just where my views upon professional attitude and sound business policy consolidate into one joint effort for the patient's benefit, and incidentally my own."

Like every other good thing, Listerine has been counterfeited, as many a physician has found to his regret, none of the "just as good and cheaper" preparations approaching it for trustworthy antiseptic service.

THE BLOOD IN ERYSIPELAS.—M. Chantemesse has sent to the Société de Biologie an account of his examinations of the blood in patients suffering with erysipelas.—"Gazette Hebdomadaire," 26th February. The examination of the white globules affords very important information regarding the evolution of erysipelas.

The leucocytosis does not, he says, influence in any proportionate degree all the elements of the blood. It is the polynucleariés that are increased in numbers from the moment the disease becomes established; at the same time there is observed a global diminution in the mononucleariés, affecting, principally, the lymphocytes.

When the cure begins, a diminution in the number of the polynucleariés is always observed and an increase in the number of mononucleariés. The eosinophiles which are deficient during the course of the disease do not appear until the disease has disappeared.

In conclusion, I would remark that the different suppurations

which appear sometimes during the course of erysipelas seem to constitute a favorable prognostic sign, for I have always seen that the patients who had abscesses recovered.

SALICYLATE OF SODA AND ANTIPYRINE.

MM. Bardin and Frenkel have studied the comparative effect of the action of salicylate of soda and antipyrine as diuretics, with the following results: Salicylate of soda and antipyrine have a manifest action as diureties. Salicylic acid increases the flow of urine; antipyrine retards it. In dogs this effect is seen immediately after the injection of O gr. 03, to O gr. 06 of each of these salts into the circulation. In both the action on the kidneys lasts only a few minutes. With the acceleration of urine, salicylate of soda causes a vaso-dilatation of the kidney and a very slight increase of general tension. The antipyrine also increases the blood pressure, but it diminishes the secretion of urine and causes a vaso-constriction of the vessels of the kidneys.

PASTE FOR REMOVING BLACKHEADS.—The application at night of a paste composed of the following ingredients is recommended by dermatologists:

Precipitated sulphur	1 dram.
Green soap	1 dram.
Precipitated chalk	1½ drams.
Zinz ointment	1 ounce.

After keeping the skin well covered with this during the night, most of the blackheads may be washed out in the morning.

Another paste, which has been used with good results, is the formula of Prof. Unna, the eminent German dermatologist. It has the following composition:

Kaolin	4 parts.
Glycerin	3 parts.
Acetic acid	2 parts.

Apply in the same manner as directed in the preceding formula.—"American Druggist."

EDITOR'S TABLE.

SANITARIAN, MAY, 1899.

All correspondence and exchanges, and all publications for review, should b dressed to the Editor, Dr. A. N. Bell, Brooklyn, N. Y.

THE SANITARIAN AND ERROR CORRECTED.

PHILADELPHIA, April 14, 189

DR. A. N. BELL, Editor SANITARIAN:

Dear Doctor: I cannot better express the estimation in w the State Board of Health of Pennsylvania holds the SANITAI than by stating that it is one of the few journals to which it scribes, and that it sees no reason to drop it from its limited The illustrated article on "The Sand Filtration of Public W Supplies," in your April number, is alone worth a year's scription for the journal, furnishing definite results and fig which cannot be obtained elsewhere. The leading articles plumbing and the utilization of city refuse are also helpfu the practical health officer. I always find valuable matter in Editor's Table. Pardon me, however, if I call attention to v I presume to be a printer's error in your statement of the nun of cases of typhoid fever reported in the city of Philadel since the first of January, 1899. The prevalence of that dis in the city at the present time is sufficiently distressing and graceful without exaggerating it. You report 8,386 cases. I understand your report, it is up to March 8th. The actual ures at the end of that week, Saturday, March 11, were 3 cases, which, as you will note, is very much less than half number which you state. Supposing, however, that your re does not end until the last day of March, the figures up to time should be 5,025. Even this enormous number does not you see, nearly reach that which you give. I feel justified th fore in requesting you to correct this statement.

Trusting that you may long continue to give the world and profession the benefit of your ripe experience in sanitary w I am,

Yours faithfully,

BENJ. LEE,

Secretary State Board of Healtl

LOCAL SANITARY ADMINISTRATION OF A CITY.

Prof. C. A. Linsley, Secretary of the State Board of Health of Connecticut, in a recent public address thus cogently expressed the essential requisites of effective municipal sanitation:

"The serviceable and effectual administration of public hygiene in a city requires a health officer who should be the responsible head of the service. He should have a corps of intelligent assistants trained in their several duties. The equipment would include a chemical and bacteriological laboratory, with experts to conduct them. They should make tests, without charge, of all suspected cases of diphtheria, consumption and typhoid fever. They should make a weekly chemical and bacteriological test of the public water supply. There should be frequent examination of all the lodging and tenement houses by trained inspectors, a sanitary inspection of all the schools, public and private, at intervals at the discretion of the health officer; also of all public buildings and places of public resort; an immediate reporting to the health office of all contagious diseases, by telephone, at the expense of the city. Every house lodging a contagious case should be placarded with the name of the disease. The health office, like the fire department, should be open day and night for the reception of reports and complaints.

"There should be a constant sanitary supervision of all premises exposed to infection. The reports of the several bureaus should be published at regular intervals for the information and satisfaction of the public.

"There should be a careful supervision of the milk traffic. No milk should be retailed except under the privilege of a license. A record should be kept of every dairyman who can furnish a certificate that his cows are free from tuberculosis. Every retailer of milk should be required to keep constantly at the health office a corrected list of the customers, so that in case of an infectious disease reported at the office it can at once be determined by reference to the records whether or not the victims are limited to the list of any one dealer. In every city where such efficient service has been put in operation there has followed a marked reduction in the death rate."

THE WINDSOR HOTEL FIRE.

The loss of forty lives—so far as results thus far have been reported—by this fire, have attracted widespread attention. The

investigation of its cause has been thorough, but nothing definite learned as to why or where the conflagration started. The best promise of the investigation is its significance with regard to many other hotels of like inflammable condition and worthless means of escape. The Windsor had iron ladder escapes on two sides, and a safety rope in every room, but neither means proved satisfactory, and the latter was responsible for several fatalities. Only a practised athlete can descend a long rope without injury, and the excited men and women who essayed the task were often compelled to relax their hold long before the ground was reached. With reference to the stairways, it is doubtful whether half the guests knew which way to reach them, by which, had they known, many perhaps might have escaped before they were enveloped. The elevators are such common means of reaching the floors that stairways are but little inquired after and rarely used. But the elevators are like the stairways—indeed, worse—as fire shafts, when once ablaze, on account of the greater draft through them.

The investigation has so far borne fruit in the shape of several proposed legislative enactments with a view to preventing similar occurrences in the future, but no bill we have yet heard of has advocated a sensible, practical, and at the same time thoroughly effective plan. To be entirely safe, most of the hotels in question would have to be rebuilt from the ground up, which is manifestly impossible, but many precautions might be taken which would minimize the danger and greatly facilitate the quick extinction of a blaze.

A primary consideration should be a fireproof staircase, having no connection with the elevator shafts, but accessible from every floor. This is far superior to the dangerous outside ladders, which are difficult to descend, and are often cut off from below by flames and smoke from the windows. If party walls are impracticable by reason of poor construction, there should be doors in the hallways which, closed, could prevent draughts, and for a time, at least, confine the fire to the portion of the building where it originated. Every moment so gained may mean a saving of thousands of dollars or valuable lives. A complete sprinkler equipment is an effective check, and should be amply provided.

But this Windsor warning should not end with the New York city hotels, or even municipalities generally. Nothing but an unlucky accident is needed to repeat the horror in a hundred summer resorts. We would rather take our chances in another Windsor than in scores of them. State legislation, carefully

studied, should extend to the hundreds of tinder boxes which are only waiting favorable conditions to repeat the story of the Windsor disaster. Every important summer resort, with rare exceptions, is filled with them. The worst danger that the sojourner at an American caravansary has to fear to-day is fire, and few of the traveling public occupy an upper room in one of them without reckoning on the chances of escape. The spasmodic movements for a reform that are following this latest fire are so many outbursts of the universal feeling that something must be done.

You can't trust watchers, nor fire extinguishers, nor ample stairways, nor fire escapes, to offset a quick-burning hotel construction. If anybody had doubted that fact before, this latest New York catastrophe must have disposed of the doubt. There is only one remedy. Make it impossible for a hotel to burn as the Windsor burned. Any substitute for this is a delusion. The precautions taken there to prevent just what happened were of the best. They proved utterly worthless. The conditions that would favor discovery, extinction and escape were the most favorable that could be imagined. They, too, were worthless. There are just two courses. Stop the use of dangerous buildings as hotels, or so advertise the dangerous ones that their frequenters will know the chances they are taking.

HOW TO PREVENT FIRES.

Suggestions from the Annual Report of State Fire Marshal E. J. Lawyer, of Maryland.

Be satisfied that water is passing freely through all pipes in the kitchen before kindling the fire in the range.

Build no hearth fires before assuring yourself of the insulation of hearths from rafters or other woodwork.

Watch carefully the joints in furnace flues and protect all woodwork in the cellar from furnace heat.

Pass no stovepipe through partitions or ceilings without having a non-conductor of heat around it.

Clean chimneys and flues once a year wherever wood is burned in hearths or stoves.

Keep matches in a metal case and out of reach of children.

Never replenish a lamp or oil stove while it is burning.

Do not hang curtains or other drapery near gas jet.

Never use kerosene in kindling fires in stoves.

Do not use sawdust in spittoons.

Avoid carrying a lighted lamp.

THE LENGTH OF HUMAN LIFE.

"According to M. I. Holl Schooling, of Brussels," says ' mos" (February 18th), "there is an old rule for finding the l of a man's life if the present age lies between 12 and 86 ; This is the rule: Subtract the present age from 86 and divic remainder by 2; the result will give the number of years you yet to live. This old rule was discovered by the mathemat DeMoivre, who emigrated to England from France in 1685 became a member of the Royal Society. The curves given b Schooling are interesting to examine. A first diagram show chance that every man has of living one year longer than his ent age. At birth this chance is 5 to 1; at five years, 119 to ten, 512 to 1; at fifteen, 347; at twenty, 207; at twenty-five, at thirty, 120; at thirty-five, 97; at forty, 78, etc. M. Scho affirms from his calculations that of 1,000 individuals of years 599 will live to be seventy, 120 to eighty years and 17 ninety; while of 1,000 nonagenarians 4 will reach their hund year. We may add that for men of sixty-five the average e tation of life is 10¾ years."—Translation made for "The Lit Digest."

FIVE CENTENARIANS.—Kate Snodgrass died in Milford C O., last month, aged one hundred and three years. Mrs. Hayes Alexander, the oldest person in Saratoga County, York, died recently at West Charlton, N. Y. She was bc Salem, Mass., January 22, 1798. Sophia Gray has recentl at Chatham, England, at the age of one hundred and five Mr. Michael Shea has died in Indianapolis, Ind., at the re age of one hundred and nineteen years. Catharine Strain d Syracuse, N. Y., April 7, at the reputed age of one hundre seven years.

RESTRICTION OF CONSUMPTION.

The Health Commissioner of Baltimore tells us ("Bal Herald," April 2) that, during the year 1898, 10,385 p die in Baltimore, and that 1,061 of these, or about one-te the total dying, succumbed to consumption. In addition to over 1,000 persons died of pneumonia, which, in many may be set down as tuberculosis. In his report the Health missioner says that consumption can certainly be classe preventable disease.

Dr. John S. Fulton, secretary of the State Board of I says that isolation of consumptive cases would restore m

health, and, while this would be an enormous undertaking for any State or municipality, he is sure that it would be profitable. Tuberculosis of the lungs is curable in a large number of instances, and the means for this cure are not so inaccessible as was formerly the case; that many sections of Maryland furnish favorable climatic conditions for the establishment of hospitals for consumptives. He refers to the efforts of the Hospital for Consumptives of Maryland, which has been doing a limited but a very effective work in the past few years. The directors and lady managers of this institution failed last year to obtain a suitable place in the country; but now they have several pieces of property in view, and, with the aid of generous friends, they hope to move the hospital to the country at a not remote period. If small-pox, measles, yellow fever, or even Asiatic cholera, should be the cause of half as many deaths as consumption has caused the public would be aroused at once. It is the familiarity with consumption that makes it so dangerous.

The Hospital for Consumptives is doing a wonderful work for the facilities it possesses; its prospects are bright, and the energy of those interested in it is undaunted.

GOVERNMENT RESERVATION FOR THE CARE OF CONSUMPTIVES.

President McKinley has signed an order transferring the military reservation at Fort Stanton, New Mexico, from the jurisdiction of the War Department to that of the Marine Hospital Service, for use in the care and treatment of soldiers, sailors and marines suffering from consumption. The reservation comprises 10,000 acres and is on the line of the Gulf, Colorado & Santa Fe railroad, fifty miles from Laguna. It was selected by Surgeon-General Wyman of the Marine Hospital Service, on account of its climatic advantages for the treatment of diseases of the lungs. Arrangements will be made for the speedy erection of the necessary hospital buildings and the detail of a competent corps of physicians, nurses and attendants. The institution is believed to be something more than a mere experiment, as the climate has already demonstrated its efficacy in the treatment of consumptives. The institution will be managed in practically the same manner as the army and navy hospital at Hot Springs, Arkansas, and will at first be devoted entirely to the treatment of officers and men of the army, navy and marine corps. It is contemplated that in case it is found possible and expedient the ad-

vantages of the proposed sanitarium will be gradually extended to civilian employees and of the Government and private citizens.

CONVICTS AND CONSUMPTION.

At the recent Prison Congress, in New Orleans, Dr. Blake, Physician Inspector at the Alabama penitentiary, called attention to the fact that consumption is greatly on the increase in prisons in the South. Taking his own State, he quoted statistics to show that in sixteen years the percentage of convicts to die from consumption had risen from 17 per cent. to nearly 37 per cent., while during one year—that of 1895-'96—above 50 per cent. of the deaths in the penitentiary had been from that disease. Dr. Blake quoted figures from Mississippi, Texas, Georgia, Virginia, and other States, going to show that consumption had steadily increased among the prison populations. In Texas, in 1896, two-thirds of the total number of deaths of convicts were caused by consumption. The trouble, according to Dr. Blake, lies in the fact that tuberculous and non-tuberculous convicts are herded together. Especially is the herding marked in the winter months, when the greater number of convicts are crowded into the smallest possible space, in order to economize fuel and blankets.

HEALTH AND ACCIDENT INSURANCE COMBINED.

The Pacific Mutual Life announces ("Insurance Monitor" for April) an innovation whose value all will recognize. It has expanded its combination health and accident policy to partial disabilities to risks not heretofore included, and granting increased and more extended benefits, while at the same time returning all premiums in case of death. In short, under one of these policies protection in case of disability of any kind appears to have been extended to almost every case where it could be safely granted.

MEANS OF RENEWING OXYGEN IN VITIATED AIR.

An important discovery was announced in the French Academy of Medicine, by M. Georges Jaubert, January 26, on how to supply air or renew oxygen in air for a man in a hermetically inclosed space like a diving bell. The discoverer's hypothesis is that 79 per cent. of all nitrogen contained in respirable air remains intact after 21 per cent. of the oxygen has been consumed, and the same nitrogen, mixed with a new supply of oxygen, becomes respirable air when the carbonic acid and the vapor produced by breathing are removed.

Jaubert found that his hypothesis was correct. The most important question was the generation of oxygen. It appears that he discovered a chemical substance which, by contact with the atmosphere, clears the vitiated air of all impure gases produced by respiration and refurnishes automatically the requisite quantity of oxygen. He states that six or eight pounds of this substance will enable a man to live for twenty-four hours in a diving bell.

MICROBES were convicted of being murderers long ago. Now they are indicted as incendiaries by a Frenchman, and we are ready to credit the charge. They have been proved the authors of so much misery to the human race that we are not in the least surprised when told that the spontaneous combustion of hay is their work. Fermentations of all kinds are due to them. Keep out the microbes and the best yeast ever made would not raise a batch of bread.

The only wonder is that somebody did not find out long ago that the microbes were responsible for the farmers' losses. The knowledge does not promise to be very valuable. There is no way of keeping the microbes out of the hay. But they can only get in their fine work, with moisture to help them. So the old rule continues to hold good. Keep dampness out of the hay and the microbes will be powerless.

A MONUMENT TO PASTEUR was unveiled at Lille on Sunday, April 9. On the same day the Pasteur Institute of Lille was formally opened. M. Viger, Minister of Agriculture (who is a doctor of medicine), and M. Guillain, Minister for the Colonies, presided at the ceremonies.

REAR-ADMIRAL VAN REYPEN.—Through the action of the naval personnel bill, passed by the last Congress, Dr. Van Reypen, the Surgeon-General of the Navy, in common with the other bureau chiefs, receives the rank and pay of a rear-admiral.

PERILS OF SANITATION.—The recent occurrences in Colorado and Texas illustrate the possible dangers of sanitation attempts with unenlightened individuals. A health officer was ordered to prevent a public funeral of a person who had died of a contagious disease, and he was killed in the performance of his duty. As the Chicago "Post" says editorially: "He was a victim of the idea

that health laws are made for the purpose of distressing those who already are sufficiently distressed." There is, with all our boasted enlightenment, a large amount of barbaric ignorance in this country, not only among the recently imported elements, but also among those who should know better. As the "Post" says, there is a feeling apparently existing in some degree among persons esteemed and esteeming themselves educated and intelligent, that the laws relating to contagious and infectious diseases are made to be ignored. If this is not a sign of what we have charitably called it, barbaric ignorance, it is something worse; it means a reckless indifference to law and to human life.—"Journal of the American Medical Association."

HEALTH AND SANITATION AT MANILA.—Some time ago an ex-officer of the British army wrote to the Secretary of State, John Hay, in regard to the health of the American troops in the Philippines and expressed the fear that the troubles which had overtaken the British in India would likely befall the Americans. The letter was sent to General Otis, who returned it with the following endorsement: "The troops here soon become acquainted with and accustomed to the climate. At present, as affairs are somewhat critical, military duty is exacting; but I think, however, that the health of the command will compare favorably with that of the British army in India, there being only eight or nine per cent. on sick report for all causes. The condition of this command is constantly misrepresented in the United States." Considering that the American troops in the Philippines are fighting in a tropical climate where the temperature is constantly so high that the breech-clout is the sole covering of a large proportion of the population, the percentage reported by General Otis should be a matter for felicitation rather than for misrepresentation.—"Army and Navy Journal."

DAMAGES FOR TYPHOID FEVER.—A man in Philadelphia has been awarded $1,500 damages for an attack of typhoid fever attributed to contamination of his water-supply by the overflow from a sewer left uncompleted by the city.

BILL TO IMPROVE SWEAT-SHOPS.—Governor Roosevelt has signed the anti-sweat-shop bill, which provides that no room or apartment in any tenement or dwelling house, or in a building situated in the rear thereof, shall be used for the purpose of manu-

facturing, altering, repairing, or finishing therein clothing of any kind, purses, artificial flowers, feathers, cigars, cigarettes, or umbrellas, unless a license has been secured therefor from the State factory inspector. It is the duty of the latter, before granting a license, to see that the place where manufacturing is carried on is in a sanitary condition. This law does not apply to the manufacture of collars, cuffs, shirts, or shirt waists made of cotton or linen fabrics that are subjected to the laundering process before being offered for sale.

THE GERMAN RED CROSS MEDAL.—This decoration has been created by the German Emperor at the suggestion of the Empress. The medal will be given to men and women belonging to the Red Cross Association who distinguish themselves by their zeal.

PENSIONER REGRETS HIS CURE.—A Minnesota veteran, having given a public testimonial to a patent-medicine firm that its medicine has restored him to perfect health, is now trying to set himself right with the Pension Office, which proposes to take him at his word and cut him off the pension rolls.

THE JAPANESE AND SANITATION.—The "Texas Medical Journal" for March says that the Japanese believe in sanitation. The town of Teukcham, on the island of Formosa (taken from the Chinese), has a population of forty thousand, with a high death rate. It is situated in a swamp, and cannot be drained. The government has caused the inhabitants to pull up, root and branch, and move to a higher site, some miles off, giving to each householder the same size lot as he had at home, and—as the new town was laid off somewhat after the pattern of the old one, except that the streets are wider—a location corresponding to the one he vacated. The government put in sewers, water, light, etc., at public cost.

The writer adds: "I wish we had a Japanese Governor and Legislature in Texas."

TUBERCULOSIS IN TENEMENT-HOUSES.—On March 21 President Murphy, of the New York City Board of Health, ordered an inspection of tenement-houses with a view to ascertaining the number of cases of consumption among the inmates. The inspectors will distribute slips to the tenants, on which are printed directions as to prophylaxis, etc.

A CRUEL EXHIBITION STOPPED.—The Society for the Prevention of Cruelty to Children stopped the exhibition of children bicycle riders at the spring cycle show, held in this city last week. The youngest rider was a little girl about two years old, and the oldest was only nine years.

ADULTERATED CANDY.—The Board of Health has instituted an examination of the candy sold to the public school children of the city. Inspectors have been sent to visit all the candy shops near the public schools and to obtain samples of the candy sold there, in order to have them analyzed.

TREATMENT OF RABIES BY THE BOARD OF HEALTH.—During the past year fifteen persons bitten by supposedly mad dogs received preventive inoculations, after the Pasteur method, from the physician of the New York Board of Health.

ANTITOXIN BILL DEFEATED.—The "Collier" bill to prevent the sale of antitoxin and other serums by the New York City Board of Health was defeated in the Assembly at Albany on March 30.

THE ROCHESTER SCHOOL SYSTEM NEEDS REVISION.—On March 22 the Governor sent a message to the Legislature calling attention to the need of immediate legislation to relieve the unsatisfactory conditions existing in the school system of the city of Rochester, which are described in the message as threatening imminent danger to the health of the children and their wholesale destruction in case of fire.

MORTALITY AND MORBILITY REPORTS AND REVIEWS.

Correspondents under this head are particularly requested to be as prompt as possible.

NEW YORK, 7,110,000. By Secretary's Bulletin for the month of February, 1899: Total number of deaths, 10,763; under 5 years, 1,506; annual death rate per 1,000, 19.7; deaths from cerebro-spinal meningitis, 45; typhoid fever, 116; malarial diseases, 20; smallpox, 1; scarlet fever, 87; measles, 37; erysipelas, 36; whooping-cough, 76; diphtheria, 236; diarrhœal diseases, 101; acute respiratory diseases, 2,329; consumption, 1,204; puerperal diseases, 64; digestive system, 651; urinary system, 765; circulatory system, 1,045; nervous system, 1,200; cancer, 320; accident and violence, 412; old age, 710; unclassified, 1,308.

City of New York, 3,550,053, February, 1899: Total deaths, 5,306; under 5 years of age, 1,564; annual death rate per 1,000, 19.52; from cerebro-spinal meningitis, 24; typhoid fever, 16; malarial diseases, 12; smallpox, 1; scarlatina, 62; measles, 33; erysipelas, 24; whooping-cough, 34; diphtheria, 160; diarrhœal diseases, 46; acute respiratory diseases, 1,184; consumption, 725; puerperal diseases, 37; digestive system, 315; urinary system, 453; circulatory system, 412; nervous system, 461; cancer, 147; accident and violence, 237; old age, 126; unclassified, 797.

New York City: Borough of Manhattan, 1,953,569. Total deaths, 2,968; under 5 years, 929; annual death rate per 1,000, 19.8; from typhoid fever, 8; diphtheria, 81; phthisis, 392; acute respiratory diseases, 647.

Borough of the Bronx, 163,537: Total deaths, 242; under 5 years, 72; annual death rate per 1,000, 23.2; from typhoid fever, 1; diphtheria, 4; phthisis, 83; acute respiratory diseases, 60.

Borough of Brooklyn, 1,231,548: Total deaths, 1,751; under 5 years, 502; annual death rate per 1,000, 18.8; from typhoid fever, 7; diphtheria, 68; phthisis, 222; acute respiratory diseases, 417.

Borough of Queens, 134,139: Total deaths, 189; under 5 years, 49; annual death rate per 1,000, 18.3; from diphtheria, 6; phthisis, 17; acute respiratory diseases, 43.

Borough of Richmond, 67,260: Total deaths, 106; under 5 years, 12; annual death rate per 1,000, 20.5; from diphtheria, 1; phthisis, 11; acute respiratory diseases, 17.

SOME INTERESTING FIGURES FOR THE LAST QUARTER OF 1898.

The Health Department's report for this quarter, as published in the "City Record," shows that nearly half a million inspections were made by officers of the department, as follows:

By the sanitary inspectors	34,276
By the sanitary police	126,721
By the division of food inspection and offensive trades	277,309
By the division of contagious diseases	21,070
By the division of bacteriology	4,974
By the division of medical school inspection	30,223
Total	494,573

During the quarter, 1,176,809 pounds of milk, fruit and f meat and fish were condemned and seized. There were ma the inspectors of vaccination 13,638 vaccinations and reva tions. There were 6,457 cases of contagious diseases report which 2,170 were diphtheria, 1,366 measles, and 1,490 s fever.

During the quarter there were in the city 15,792 deaths, of which were in Manhattan, 5,114 in Brooklyn, 931 in the B 570 in Queens, and 329 in Richmond.

The Daily Milk Supply to the borough of Manhattan, ci New York, amounts to 1,212,000 quarts. It is obtained p pally from the States of New York, New Jersey, Connec Pennsylvania and Massachusetts, the amount produced bei the order named. The city receives daily from railroads 88 quarts; from farmers in the city, 232,000 quarts; from far adjoining the city, 100,000 quarts. In addition, of cream ar ceived 20,000 quarts, and of condensed milk 10,000 pounds.

Albany, 100,000: Total deaths, 212; under 5 years, 52; ar death rate per 1,000, 25.5; from typhoid fever, 12; diphth 7; phthisis, 25; acute respiratory diseases, 31.

Troy, 65,000: Total deaths, 114; under 5 years, 17; annual d rate per 1,000, 22.5; from typhoid fever, 7; phthisis, 15; a respiratory diseases, 21.

Utica, 55,000: Total deaths, 75; under 5 years, 7; annual d rate per 1,000, 17.5; from diphtheria, 2; phthisis, 9; a respiratory diseases, 13.

Syracuse, 120,000: Total deaths, 151; under 5 years, 25; an death rate per 1,000, 16.4; from typhoid fever, 2; diphth 4; phthisis, 22; acute respiratory diseases, 36.

Buffalo, 360,000: Total deaths, 404; under 5 years, 141; an death rate per 1,000, 14.4; from typhoid fever, 5; diphth 15; phthisis, 46; acute respiratory diseases, 80.

Rochester, 175,000: Total deaths, 196; under 5 years, 42; an death rate per 1,000, 14.6; from typhoid fever, 3; diphtheri phthisis, 27; acute respiratory diseases, 39.

Yonkers, 42,000: Total deaths, 64; under 5 years, 26; an death rate per 1,000, 17.8; from phthisis, 6; acute respira diseases, 16.

Cohoes, 25,000: Total deaths, 49; under 5 years, 19; an death rate per 1,000, 23.5; from typhoid fever, 3; phthisi acute respiratory diseases, 12.

Kingston, 25,000: Total deaths, 33; under 5 years, 10; annual death rate per 1,000, 16.5; from phthisis, 1; acute respiratory diseases, 11.

Poughkeepsie, 25,000: Total deaths, 46; under 5 years, 5; annual death rate per 1,000, 22.5; from typhoid fever, 3; phthisis, 4; acute respiratory diseases, 5.

Newburgh, 26,000: Total deaths, 29; under 5 years, 9; annual death rate per 1,000, 14.5; from typhoid fever, 1; phthisis, 6; acute respiratory diseases, 7.

Schenectady, 27,000: Total deaths, 47; under 5 years, 9; annual death rate per 1,000, 21.0; from phthisis, 3; acute respiratory diseases, 14.

Binghamton, 45,000: Total deaths, 56; under 5 years, 3; annual death rate per 1,000, 15.0; from phthisis, 5; acute respiratory diseases, 11.

Elmira, 40,000: Total deaths, 59; under 5 years, 12; annual death rate per 1,000, 17.7; from phthisis, 8; acute respiratory diseases, 12.

Oswego, 22,000: Total deaths, 32; under 5 years, 10; annual death rate per 1,000, 17.5; from typhoid fever, 1; phthisis, 1; acute respiratory diseases, 4.

ALABAMA.—Mobile, 37,817, Jan. and Feb., '99: Total deaths, 160; under 5 years, 36; annual death rate per 1,000, 24.8; from consumption, 25; acute respiratory diseases, 35.

Tuskegee, Ala., March 31.—Five cases of smallpox have developed at the Normal School (colored) here, and the council has quarantined against the school and all passing from the western portion of the county.

CALIFORNIA.—San Francisco, 360,000, Feb., 99: Total deaths, 656; under 5 years, 120; annual death rate per 1,000, 21.8; from typhoid fever, 19; diphtheria, 3; consumption, 49; acute respiratory diseases, 56.

Los Angeles, 103,000, Feb., '99: Total deaths, 170; under 5 years, 16; annual death rate per 1,000, 19.8; from diphtheria, 3; consumption, 34; acute respiratory diseases, 23.

COLORADO.—Denver, 167,000, Feb., '99: Total deaths, 173; under 5 years, 31; annual death rate per 1,000, 12.3; from typhoid fever, 2; phthisis, 42; acute respiratory diseases, 24.

CONNECTICUT.—167 towns, 892,410, Feb., '99: Total deaths, 1,192; under 5 years, 230; annual death rate per 1,000, 16.0; from typhoid fever, 10; diphtheria, 14; phthisis, 126; acute respiratory diseases, 232.

New Haven, 112,000, Feb., '99: Total deaths, 139; under 5 years, 28; annual death rate per 1,000, 14.3; from typhoid fever, 3; diphtheria, 2; phthisis, 21; acute respiratory diseases, 13.

Hartford, 80,000, Feb., '99: Total deaths, 107; under 5 years, 21; annual death rate per 1,000, 14.5; from typhoid fever, 3; phthisis, 12; acute respiratory diseases, 15.

Bridgeport, 65,000, Feb., '99: Total deaths, 89; under 5 years, 25; annual death rate per 1,000, 16.4; from phthisis, 10; acute respiratory diseases, 20.

Waterbury, 45,000, Feb., '99: Total deaths, 59; under 5 years, 21; annual death rate per 1,000, 15.7; from phthisis, 3; acute respiratory diseases, 12.

DELAWARE STATE BOARD OF HEALTH.—Dr. E. W. Cooper, of Camden, has been elected President, and Dr. Alexander Lowber, of Wilmington, secretary.

DISTRICT OF COLUMBIA.—280,250, 4 weeks, March 25, '99: Total deaths, 431; under 5 years, 126; annual death rate per 1,000, 20.0; from typhoid fever, 5; diphtheria, 3; phthisis, 51; acute respiratory diseases, 85.

April 4.—Cerebro-spinal meningitis has prevailed here since the latter part of February. It has been very fatal. Dr. Wm. B. French has been appointed special sanitary inspector to investigate it.

ILLINOIS.—Chicago, 1,650,000, Feb., '99: Total deaths, 2,240; under 5 years, 721; annual death rate per 1,000, 14.3; from typhoid fever, 24; diphtheria, 62; phthisis, 192; acute respiratory diseases, 621.

April 3: Scarlet fever increasingly prevalent. The deaths from it last week—twenty in number—are the most ever recorded in any one week since the Health Department began the system of weekly records.

INDIANA.—At the quarterly meeting of the State Board of Health (April 14th) T. Henry Davis, M. D., of Richmond, was

elected President; E. D. Laughlin, M. D., of Orleans, Vice-President, and J. N. Hurty, M. D., of Indianapolis, re-elected Secretary. In evidence of the appreciation of the progress made by the board in the protection of the public health, the outgoing Legislature raised the salary of secretary from $1,200 to $2,400 and increased the appropriation for sanitary work from $4,000 to $9,800.

The board adopted the Bertillon system of registration.

IOWA.—Des Moines, 72,000, Feb., '99: Total deaths, 60; annual death rate per 1,000, 8.3; from phthisis, 7; acute respiratory diseases, 9.

Davenport, 36,000, Feb., '99: Total deaths, 36; annual death rate per 1,000, 9.9; from phthisis, 4; acute respiratory diseases, 5.

Davenport, March 29.—An epidemic of cerebro-spinal meningitis, which resulted in a dozen deaths in Rock Island and Moline, has spread to Davenport, one death occurring here and two more cases having developed. Stringent measures will be taken to prevent a contagion, and the State Board of Health has been appealed to to adopt strict rules regarding the quarantine of the disease. The epidemic prevails in several towns in the State.

Chariton, Ia., March 30.—The city is greatly excited over the prevalence of deaths from spinal meningitis. There have been six deaths in a week and several new cases are reported. The disease seems mostly among school children, and the board met to-night and closed one room.

INDIAN TERRITORY.—Muscogee, Feb. 14.—A courier arrived here from Morse, in the western part of the Creek Nation, bringing news that smallpox is raging in that section, and not less than thirty-five persons had died of it in the last few weeks. The victims were negroes and Indians.

LOUISIANA.—New Orleans, 300,000 (90,000 colored), Feb., '99: Total deaths, 719—266 colored; under 5 years, 139; annual death rates per 1,000, white, 21.5; colored, 29.5; 23.9. Deaths from typhoid, 7; consumption, 86; acute respiratory diseases, 127.

Flushing the Gutters.—"We will have sewerage in a few years ('Times-Democrat,' March 31), and can then keep New Orleans in such a thorough sanitary condition that we will have nothing

more to fear from filth diseases; but until we get sewerage we must depend upon flushing the gutters with pure river water."

> To-MORROW, and to-morrow, and to-morrow,
> Creeps in this petty race from day to day,
> To the last syllable of recorded Time:
> And all our yesterdays have lighted fools
> The way to dusty Death. Out, out, brief candle!
> Life's but a walking shadow; a poor player,
> He struts and frets his hour upon the stage,
> And then is heard no more: it is a Tale
> Told by an idiot, full of sound and fury,
> Signifying nothing. —*Shakespeare.*

MARYLAND.—Baltimore, white, 463,000; colored, 78,000: 541,000. January: Total deaths, 1,019—794 whites, 225 colored; death rates, 20.57, 34.61: 22.60; 43 died from infectious diseases, 92 from consumption, 145 from pneumonia, 34 from bronchitis, 140 from influenza, 55 from Bright's disease, 35 from apoplexy, and 12 from typhoid fever; 269 or 26.39 per cent. of the total deaths were in children under 5 years of age; cases of infectious diseases reported during the month, 262.

MASSACHUSETTS.—Boston, 541,827, Feb., '99: Total deaths, 912; under 5 years of age, 253; annual death rate per 1,000, 20.2; from typhoid fever, 4; diphtheria, 17; consumption, 105; acute respiratory diseases, 213.

The Spitting Nuisance.—An order has been issued by the Board of Health extending a former order prohibiting spitting in public places. It is in accordance with a plan which has been under consideration by the board for some time, and the order as issued has the approval of the city's law department.

The order declares: "The deposit of sputum in public places is a nuisance, source of filth and cause of sickness," and orders "that spitting upon the floor, platform or steps of any railroad or railway station, car, public building, hall, church, theatre, market or any sidewalk immediately connected with said public places," be prohibited. That such a regulation can be enforced has already been demonstrated in court, where people have been fined for spitting in street cars.

April 13: Cases of smallpox have been unreported and unrestricted in their movements in Boston for the last eight weeks. Four scattered cases have been secured in the last three days, two of which were traveling about. The situation demands and will receive effective attention. It is important that vaccination and revaccination be generally done at once. Those who desire it will be given free vaccination at 48 different schoolhouses and ward rooms which will be open from 7 to 9 o'clock nightly, for one week, beginning April 14. The Board of Health, Samuel H. Durgin, M. D., Chairman.

MICHIGAN.—2,189,211, Feb., '99: Total deaths, 3,778; under 5 years, 939; annual death rate per 1,000, 20.7; from typhoid fever, 28; diphtheria, 44; phthisis, 196; pneumonia, 632.
Detroit, 237,798, Feb., '99: Total deaths, 398; under 5 years, 129; annual death rate per 1,000, 18.6; from typhoid fever, 2; diphtheria, 11; phthisis, 29; pneumonia, 66.

MINNESOTA.—Reports of the State Board of Health, 1895-1898: An octavo volume of nearly 500 pages. The first 49 pages are taken up with the Eighth Biennial report, 1895-'96, Charles N. Hewitt, M. D., Secretary. At the end of that period there were 1,782 local boards of health in co-operation with the State Board, besides 22 village boards also in co-operation, but by whom no reports had been made. Arrangements had been effected with the quarantine officers of New York and Canada by which notifications were received of immigrants destined for Minnesota, who had been exposed to infectious diseases, and promptly sent to the health officers of the localities to which such immigrants were bound, with a view to such inspection and isolation of persons and disinfection of effects as necessary for the protection of the community.

The outbreaks of epidemic diseases in the State during the two years were: Scarlatina, 440 cases, 16 deaths; diphtheria, 1,196 cases, 209 deaths. Township nurses and isolation houses are urged as important necessities for the proper care of the sick with, and the prevention of the spread of, infectious diseases. The indifference of local authorities and their disinclination to provide the necessary expenses are a constant obstacle to the maintenance of efficient sanitary service. The reports on vital statistics are summed up for a period of nine years ending

1896. Of diphtheria there was a steady decline in the mortality for the whole period. The average number of deaths from it per 100,000 population was 43.9. The decrease is chiefly attributed to the use of antitoxine. Deaths from typhoid fever were, in 1895, 36 per 100,000 population; the average for the nine years, 42.5. The greatest prevalence of this disease was in Duluth, in 1896—103 deaths. No other disease was markedly prevalent during the period.

Laboratory work appears to have been begun by the secretary in October, 1894, in the laboratory of the University, at Minneapolis. He made many examinations of water supplies; 709 specimens of diphtheria collected from 62 localities; 208 of tubercula sputa, from 41 localities.

The Bacteriological Laboratory of the Board was established, and Dr. F. F. Wesbrook made Director of it, under Dr. Hewitt's auspices, at the annual meeting of the Board, 1896. Dr. Wesbrook's first annual report is appended. But the lack of equipment delayed work until May. The summary for the period shows nearly 1,000 examinations of specimens of suspected diphtheria; many specimens of water supplies, sink-cleanings, earth, milk, etc.; many also of blood specimens of suspected typhoid fever; of sputum for tuberculosis; material for rabies; hog cholera and swine plague: altogether representing a zealous recognition of the utility of the laboratory by the medical profession throughout the State and much work of great practical utility for the prevention of disease.

Report for 1897-1898 is of the reorganized board, Henry M. Bracken, M. D., Secretary and Executive Officer, in place of Dr. Hewitt; Dr. Wesbrook, Director of Bacteriological Laboratory, continued. Among the first acts of the reorganized board was the following well-merited compliment to the retiring secretary:

"*Whereas,* Dr. Charles N. Hewitt, who has been the Secretary of the Minnesota State Board of Health since the first organization of the board, in 1872, and is now retired by reason of the expiration of his term of membership on the board, therefore

"*Resolved,* That the members of this board hereby express their appreciation of the valuable services which have been rendered the State by Dr. Hewitt as secretary and executive officer of the State Board of Health during the time of its existence. It is well known that during this period sanitary science and public hygiene have been greatly advanced in this country. In the work of this

advancement the State of Minnesota from the first had an important part, and is known throughout the country as having good sanitary laws, organization and arrangement. The credit of this important work in the State and the influence of the same throughout the country has been in a great measure due to the labors of the Secretary, Dr. Hewitt. The members of the Board of Health unanimously unite in this expression."

The newly reorganized board, with a preponderance of old membership, and a new executive that had already shown his interest in, though not a member of, the board, found no necessity for devising new plans. It has pursued the same lines which twenty-five years' skilful engineering have shown to be the most fruitful in sanitary results. The most notable advance has been in the work of the bacteriological laboratory, particularly with reference to the diseases of animals. Infectious diseases of animals have always been in the purview of this board, but on the reorganization of the board, at the beginning of the period now under consideration, among newly-appointed members was a veterinarian of distinction—M. H. Reynolds, M. D., V. M. He had been for some time an instructor at the State Experiment Station, and was already practically familiar with the relation of infectious diseases of animals to man: bovine tuberculosis, glanders, rabies, etc. His membership appears to have given increased impetus to the work of the Biological Laboratory. Prompt action was taken to increase the appropriation for its support and extend its sphere of investigation. For besides the animal diseases dangerous to man, the veterinarian member has kept the board in rapport with the proceedings of, and the progress made by, the Minnesota and other State experimentations in the investigation of anthrax, sheep scab, black-leg, venomous bronchitis, cornstalk disease—in short, of all animal diseases.

The growth of the work is rendered more manifest by quarterly summaries of its progress, together with the correspondence and other work by the members and committees severally.

In addition the fourth quarterly report, December 31, 1898, sums up the work of the year and tabulated statistics of diphtheria and scarlatina for three years and eleven months, January, 1895-December 1, 1898, and typhoid fever for eleven months, 1898. The number of cases of and deaths from these diseases were as follows:

Diphtheria,	1895	1,554 cases,	502 d
"	1896	1,735 "	473
"	1897	1,743 "	268
"	1898	1,334 "	188
Scarlatina,	1895	955 "	108
"	1896	685 "	62
"	1897	530 "	48
"	1898	554 "	31
Typhoid fever,	1898	847 "	225

Leprosy has been an interesting subject in the State Boar ports for several years. The present report shows that out o total of 13, and possibly 16, lepers now in the State, seven reported in 1898. The board has record of 51 lepers havin sided in the State. Of these 17 died before 1890, and very is known of their nationality, though the report says it is bel they were all from Norway. Of the 34 which have come int State since 1890 twenty-nine were probably from Norway five from Sweden. The report calls attention to the fact "undoubtedly some of those who have reported the disease at appearing after they landed in this country have not told truth. It would be fair, probably, to say that 25 of the 51 Mi sota lepers had the disease before leaving Europe."

It is brought out that, in all probability, there are at leas lepers in the State at present, and that physicians who sh know state there are probably 50. But assuming that there total of but 20, it is a safe estimate, based on the late censu Scandinavian foreign-born population, that there are also at 20 lepers in each of the four States—Wisconsin, Iowa, North South Dakota—with a probable total of 160 Scandinavian le in the United States. The board calls particular attention to fact that the Scandinavian Peninsular does not furnish all leprous people found in the United States.

The recommendation is made in the report that a Federal h be provided for these unfortunates. They could thus be c for more economically and more satisfactorily than through State provision. Segregation in single States is not practica would tend simply to drive lepers from States enforcing su practice to those States that were not carrying out the system

Special papers bearing upon sanitation by members of the b comprehended in the report as follows:

"Sanitation for the State, by the State." By Franklin Staples, M. D., President.

"The Bacteriologist and Pathologist in Medicine;" "Should Measles be Quarantined?" "Should the Tuberculous Insane be Isolated from Other Inmates of Our Asylums and Accommodations Provided for Them in Separate and Detached Buildings?" "Leprosy in Minnesota;" "Practical Application of the Serum Diagnosis of Typhoid Fever;" "Typhoid Infection;" "Suggestions Drawn from the Serum Reaction in Typhoid Fever;" "The Relationship Between the Infectious Diseases of Animals and Man." By Henry M. Bracken, M. D., Secretary.

"Preliminary Report on the Serum Diagnosis of Typhoid Fever in an Epidemic During Which Typhoid Bacillus was Isolated from the Public Water Supply;" "Serum Diagnosis of Typhoid Fever from the Public Health Laboratory Point of View;" "Preliminary Communications on Bacillus Diphtheria and Its Variants in a School in Which Diphtheria Was Epidemic;" "Preliminary Report on the Laboratory Diagnosis in Twenty Cases of Suspected Rabies." By F. F. Wesbrook, M. D., Director, and L. B. Wilson, M. D., Assistant Bacteriologist, Bacteriological Laboratory.

"Elements of Error in Interpreting the Widal Reaction in Typhoid Fever." By Louis Blanchard Wilson, M. D.

"Experimental Work with Bovine Tuberculosis;" "The Experiment Station Veterinarian as a Member of the State Board of Health;" "State Control of Hog Cholera." By M. H. Reynolds, M. D., V. M.

St. Paul, 215,582, Feb., '99: Total deaths, 167; under 5 years, 57; annual death rate per 1,000, 93; from typhoid fever, 1; diphtheria, 2; phthisis, 19; acute respiratory diseases, 33.

MISSOURI.—St. Louis, 623,000, Feb., '99: Total deaths, 923; under 5 years, 257; annual death rate per 1,000, 17.7; from typhoid fever, 7; diphtheria, 11; phthisis, 106; acute respiratory diseases, 159.

Kansas City, 200,000, Feb., '99: Total deaths, 215; under 5 years, 44; annual death rate per 1,000, 12.9; from typhoid fever, 1; diphtheria, 1; phthisis, 12; acute respiratory diseases, 67.

NEW JERSEY.—Newark, 235,000, 4 weeks, March 25, '99: Total deaths, 406; under 5 years, 101; annual death rate per 1,000,

21.9; from diphtheria, 6; typhoid fever, 17; phthisis, 55; respiratory diseases, 47.

Paterson, 114,732, Feb., '99: Total deaths, 176; under 5 year annual death rate per 1,000, 15.9; from typhoid fever, 2; theria, 3; phthisis, 24; acute respiratory diseases, 46.

March 14: The health officer submitted a special report o phoid fever, that "from Sept. 1st to March 1st last there have reported to this board 237 cases of typhoid fever. Since M 1st 61 cases have been reported. From these totals are excl all imported cases (soldiers, those brought from outside the ci the local hospitals, etc.), and not more than 30 can be attribut any special and peculiar local cause.

"Total number of cases reported within given six months fo eleven years, 1886-1896, 526.

"Average number of cases reported within specified six mc for the eleven years taken, 48.

. . . "Every known case of typhoid in the watershed been investigated and all possible means used for the discove unknown ones.

"The result is that I know of but one source of infection, v could possibly fulfil said conditions. One case of typhoid has existed which, with its accompanying conditions, could s tifically account for the outbreak from which we have suf since the beginning of September last. A case of typhoid feve veloped during the early part of August last. The attending p cian made his first visit on Aug. 16th. The drainage fron premises of said patient was through a pipe into a small trib of the Passaic river, about 8,000 feet above the intake. I notified of the case on the 23d of August, and the same da said drainage cut off from tributary.

"*Note.*—In this public report I refrain from mentioning loc and names. No public good could result by so doing (this l having been already informed as to the location and persor volved), but only annoyance to estimable people from the r ing publicity.

"Below the point of entrance of said pipe, about 2,500 fe situated a swamp, which in times of high water is more o flooded, and in times of low water contains pools and puddle off from the natural low-water channel. The vegetation is thick and tall. At the head of said swamp is situated a glu gelatine factory, the drainage from which is into said brool

swamp. The material from which the glue and gelatine is made is also soaked and washed in the waters of said brook.

"Now, on the 10th of August occurred the very heavy rainfall of 2.10 inches, the last of any great amount until the 14th of October.

"The theory, therefore, to be evolved from these facts is as follows:

"That the brook was infected from said case while high from the heavy rain of Aug. 10th; that the infected water of brook spread over said swamp and, falling, left numerous pools, puddles, etc., cut off from natural channel. That in these pools, puddles, etc., were found the conditions favorable to the vitality and multiplication of the specific bacilli, these conditions being the low dilution, the amount of organic matter in swamp from glue and gelatine factory, etc., the close and high vegetation, etc. That a certain number of these bacilli were sent down the river by each rain, with a certain amount of damage as a result—the greater the rainfall, the greater the amount of damage done.

"If this theory be true, then what have we to expect for the future?

"It seems to be almost certain that the present rise in the outbreak is practically over. It is to be hoped, from the fact that the heavy rainfall and thaw of the last week in January, when the most of the cases in this group were infected, pretty well flooded the swamp, that the resulting great dilution and washing out may have removed all danger of said swamp acting longer as a source of infection. Since the rainfall and thaw following the recent "blizzard" the entire swamp has been under several feet of water. The lesson taught is the necessity for the removal of everything which, under any circumstances, could become a source of infection of the water supply."

North Carolina.—Twenty towns, with aggregate population of 138,153 (58,975 colored), reported for 1897 2,085 deaths, 1,200 colored; under 5 years of age, 606; death rates per 1,000—white, 11.1; colored, 20.5; total, 15.1.

There were 83 deaths from typhoid fever, from consumption, 295, and from pneumonia, 165.

Twenty-five towns, population 164,088 (71,640 colored), report for 1898 2,419 deaths, 1,374 colored; under 5 years of age, 686; death rates per 1,000—white, 11.3; colored, 19.2; total, 14.7.

Typhoid fever caused 94 deaths; consumption, 303; pne nia, 137.

Twenty-four towns, population 154,603 (64,440 colored) port for February, '99, 213 deaths, 118 colored; under 5 yea age, 63; annual death rate per 1,000, 16.5; from consumption pneumonia, 45.

OHIO.—Cincinnati, 405,000, Feb., '99: Total deaths, 531; un years, 117; annual death rate per 1,000, 15.7; from ty fever, 13; diphtheria, 6; consumption, 64; acute respirator eases, 90.

Cleveland, 395,000, Feb., '99: Total deaths, 485; under 5 y 181; annual death rate per 1,000, 14.7; from typhoid feve diphtheria, 10; phthisis, 18; acute respiratory diseases, 99.

Smallpox is giving the health authorities a good deal of con Eight new cases were reported March 25th. Manufacturers business men are admonished by the Health Officer to co-op in the effort to get all the people vaccinated.

PENNSYLVANIA.—Philadelphia, 1,266,832, 4 weeks, March '99: Total deaths, 2,137; under 5 years, 534; annual death per 1,000, 23.1; from typhoid fever, 163; diphtheria, phthisis, 271; acute respiratory diseases, 316.

April 1: The Board of Health has been abolished and a bu in the Department of Public Safety created instead. Colone Lewis Good, ex-member and secretary of the old Board of He and President of the State Board of Undertakers, has been pointed chief of the new bureau. Colonel Good has discov ("Call," April 1) the cause of the nearly 5,000 cases of typ fever which have occurred in the city this year, resulting in n 500 deaths, and as soon as his discovery is verified he will shu the source of pollution entirely. All the evil he thinks has caused by the hotels along the Wissahickon creek and by a c pipe in the Mount Airy district that was discovered only by dent.

As soon as Colonel Good took charge of the Bureau of He he caused the nuisance inspectors to get a move on, so to sp and samples of water were taken from the creek from its mou its source. These samples were carefully labeled and sent to Bacteriological Department for microscopical examination. result was that the source of pollution was traced. Sample water from wells and drains at all of the hotels along the c

wore then taken, with the result of it being found that the water turned into the creek from either of them contained typhoid bacillus enough to contaminate the waters of the whole Schuylkill river.

Pittsburg, 305,000, 4 weeks, March 25, '99: Total deaths, 437; under 5 years, 138; annual death rate per 1,000, 18.4; from typhoid fever, 21; diphtheria, 6; phthisis, 38; acute respiratory diseases, 109.

Lancaster, March 24: Cerebro-spinal meningitis is prevailing to such an alarming degree here that the Board of Health will put a stop to public funerals of those dying from this disease. Of the cases reported recently all resulted fatally.

South Carolina.—Charleston, 65,165, 1 week, March 25, '99: Total deaths, 216; under 5 years, 6; annual death rate per 1,000, 20.0; from phthisis, 2; acute respiratory diseases, 4.

Washington.—Seattle, 75,000, Feb., '99: Total deaths, 43; under 5 years, 6; annual death rate per 1,000, 6.8; from typhoid fever, 5; diphtheria, 2; phthisis, 5; acute respiratory diseases, 6.

Wisconsin.—Milwaukee, 280,000, Feb., '99: Total deaths, 340; under 5 years, 138; annual death rate per 1,000, 15.7; from typhoid fever, 2; diphtheria, 10; phthisis, 23; acute respiratory diseases, 66.

City of Mexico, 344,377.—Bulletin for Febrary, 1899: Total mortality, 1,900; annual death rate per 1,000, 71.43. Chief causes of death as per classification: General infirmities, 342; diseases of the nervous system and organs of sense, 208; diseases of the circulatory system, 102; respiratory system, 734; digestive system, 373; other causes (1 to 42), 141; 716 were of children under five years of age.

Cerebro-spinal Meningitis has been very prevalent in many parts of the country the past winter, numbers of the sufferers being recently discharged volunteers. In Washington there were thirty deaths during the last three weeks of March, the majority of the victims being adults. In only one instance were there two

cases of the disease in the same family. In this case both patients were children.

CLASSIFICATION OF CAUSES OF DEATH.

A pamphlet containing an exposition of the Bertillon cation of causes of death has been issued by the American Health Association, unanimously recommending the genera tion of this system for mortality reports, at its last meet did also the conference of State and Provincial Boards of of North America. The system is used in France and is r progress in Europe and in South America. It is hoped may meet with general adoption all over the world in time tc the mortality statistics of the next century on a uniform To this end, an International Commission of Revision, senting all of the countries desiring to employ the classifi will meet in Paris at the time of the International Congr Hygiene and Demography in 1900. The several National missions constituting this body are engaged in ascertainii wishes of the registrars and users of mortality statistics o: respective countries in regard to the changes which shall be in the present form, and the present pamphlet is issued for this purpose. It will be sent, free of expense, to all p desiring it, and the advice and suggestions of all sanit: pathologists, statisticians, and others interested in the subj statistics of causes of death are earnestly solicited. Reque: the pamphlet and for other information on the subject may dressed to Dr. Cressy L. Wilbur, Secretary of the U. S. Co sion of Revision, Lansing, Mich.

SYMPATHY.—A good deacon making an official visit to a neighbor, who was a very churlish and universally unpopula put the usual question, "Are you willing to go, my friend?"

"Oh, yes," said the sick man, "I am."

"Well," said the simple-minded deacon, "I am glad you a all the neighbors are willing!"

BOOK REVIEWS.

SANITARY ENGINEERING OF BUILDINGS. By WM. PAUL GERHARD, Consulting Engineer for Sanitary Works, Mem. Am. Public Health Association, Cor. Mem. Am. Institute of Architects, etc. Vol. I. One 8vo. Cloth, pp. 454, with 103 illustrations and 6 plates. Price, postpaid, $5.00. Each volume is independent, and sold separately. New York: William P. Comstock, 23 Warren street. 1899.

A second volume of this work, which is now in actual preparation, the author tells us, will contain chapters on "Domestic Appliances," on "Domestic Water Supply," "Sanitary Arrangements for Suburban and Country Houses," "Water Supply, Drainage and Plumbing of Hospital Buildings," on "Theatre Sanitation," "School Sanitation," "Kitchen and Laundry Arrangements," "Sanitary Features of Market Houses and Abattoirs," "Baths and Bathing," "The Modern Rain Bath," and on "Sanitary House Inspection." Each of the volumes will be complete in itself, and both together are intended to serve as a guide in the numerous questions arising in the sanitary engineering of buildings.

The author is well known to our readers by several admirable contributions to our pages, and by the reviews we have given to his previous works, of which the volume now before us is an evolution. He is a book-maker in the best sense of authorship, his books being the outcome of thorough practical knowledge in the prosecution of his profession: comprehending almost every phase of sanitary engineering work common to the literature of the subject as tested by practical experience, with improvements and additions of his own devising. This volume is divided into twelve chapters: "Defective Plumbing and Sewer Gas," "Traps and Systems of Trapping," "Sewerage of Buildings," "Plumbing Fixtures," "Sewage Removal and Sewage Disposal," "The Leading Principles of House Drainage and Sanitary Plumbing," "Improved Methods of House Drainage," "The Proper Arrangement of Watercloset and Bath Apartments," "A Plea for Sanitation in Factories and Workshops," "The Sanitary Drainage of Tenement Houses," "On Testing House Drains and Plumbing

Work," "Simplified Plumbing Methods"—all elaborately trated with diagrams, cuts and plates, most of them from c designs by the author, deduced from the diverse conditi his unusually wide field of view.

Publisher's Note: "Some years ago (in 1884) the pu brought out a work by Mr. Gerhard, entitled 'Hints on the age and Sewerage of Dwellings.' This work was liberall trated and was at that time the most complete exposition subject ever published in the country. Three editions book were printed, the last one in 1894. Since then, hc there has been much progress made in sanitary science, anc tice has materially changed, both in plumbing and sewerag the time seems now ripe for a thoroughly up-to-date work subject. This the present publication aims to be. The bo been liberally illustrated and is intended to be a complete tion of the most approved modern practice. Each volun separately. Vol. I. is a large octavo volume of about 500 with about 100 text illustrations and 6 full size plates."

Altogether—including Vol. II. as contemplated—it is th complete work of the kind hitherto published: alike comme to the architect, builder, sanitary engineer, plumber and pr sanitarian.

ANNUAL REPORT OF THE TREE PLANTING AND FOUNTA CIETY OF BROOKLYN, CITY OF NEW YORK, 1898. Pp. 132. trated. Lewis Collins, Secretary, 177 Remsen street, Brc N. Y.

This book is much more than a mere report of progress important and hitherto too much neglected part of sanitary Besides being a report of much praiseworthy progress Tree Planting and Fountain Society of Brooklyn, it compr a description of trees best suited for city shade, togethe lucid instructions for their successful culture and prot The cultivation of grass, too, is comprehended, as an imp adjunct to the main purpose of this society—that of ornai tion. But from THE SANITARIAN'S point of view—in it tion to the public health—this purpose is secondary.

Every intelligent observer is more or less familiar wi high mortality, particularly among children, in the su months, among intramural populations generally, and the

among those who dwell on utterly shadeless streets and in houses devoid of turfed yards. It is under such conditions that "germ" life is promoted and zymotic diseases are cultivated. Unfortunately the excessively high temperature, so fatal as an inciting cause of fatal diseases, is too commonly regarded as an unpreventable cause. And true it is—unpreventable—without artificial means to prevent it; and the more so if the building material of houses and pavements is such as to retain the heat, which is commonly the case. But, pray, who of ordinary intelligence that does not know the effect of intercepting the sun's rays—on material substances as well as on persons?

The average summer temperature in the city of New York July, August and September) in the shade, at 3 o'clock P. M., for a period of ten years, according to reliable records, is 78°3. In the sun, the average is about 37° higher. The bare stone and brick walls and pavements, thus exposed, sometimes for several weeks without a cooling shower, speedily attain and maintain within doors a temperature above animal heat. No wonder that all who can afford it desert their stifling city dwellings under such conditions. But such conditions are for the most part preventable, and chiefly by the means within the purview of this Tree Planting and Fountain Society.

Shade trees, grass plots, fountains, daily flushed gutters and street sprinkling, in conjunction with bath-houses in abundance and surface cleaning, are the essential antidotes to otherwise fatal results of summer heat in American cities.

It is for the promotion of these salutary conditions that the Tree Planting and Fountain Society of Brooklyn is maintained. It is doing excellent work and is eminently worthy of the support of every citizen.

In the AMERICAN MONTHLY REVIEW OF REVIEWS for April the editor reviews the work of the Fifty-fifth Congress, examines the present status of the various plans for inter-oceanic ship transit, discusses the latest developments in the Philippine situation, and comments on the other news topics of the day in home and foreign politics, including the cabinet change in Spain and the altered relations of Germany, England and the United States.

CONTEMPORARY LITERATURE.

INTEREST IN KIPLING'S ILLNESS.

Last month an eminent Englishman, leaving the *L* boarded one of the degenerate horse-cars struggling throu brutal mud and confusion of the West Side track along th Not finding a seat, he stood on the rear platform and g over an "extra" pushed into his hands by an enterprising boy, to learn what had been going on during his week out world. The shabby conductor craned over the newcomer's der, and failing to see what he wanted, asked: "How i "Who?" said the Englishman. "Why, Kipling. The las said he was getting better, didn't it?" The owner of the shared the news of the "extra's" bulletin, to the relief of quirer. "Oh, he oughter've been poet lawyrit instead mushy Alfred Austin," continued the conductor, with a disgust. While Mr. Kipling lay ill at the Grenoble Hotel drove rapidly to the door without a fare. The driver j from his seat, ran into the hotel, and read the latest bulle marking to a bystander that he had promised to get the las for the boys at the stable. Office-boys discussed over thei the pathological probabilities of this particular case of monia, and brakemen leaned out from their platforms to p latest advices to incoming brethren. Clerks and busine on the way to the office did not talk of the grippe and the w but of the sick man's progress. Churches, not only in th cities close at hand, but in far-away corners of the coun fered up prayers for his recovery, and made the "Recessi part of their service. Doubtless Mr. Kipling would pri manifestations in his roughly deprecating way more th earnest words of the Kaiser's cablegram, or the continual of anxious calls and inquiries from the people of his ow and the other best minds of England and America, who be certain to appreciate the loss that threatened.—From "I in America," in the "American Monthly Review of Revie April.

THE FLOWER OF FAME.

He sought it before the billow of spring on the meadow was seen,
When only the flush of the willow was tracing the river with green;
He scanned to the edge of the fraying snows that dappled the mountain slope,
And ever too late the March sun rose: for he searched the world with hope.

I saw him at noon of the summer day, and that was the favorite hour
To one who had hunted from March to May, and never had found a flower;
For the light was full, as though the sun were aiding his eager quest,
And there were no warning shadows to run o'er his path from east or west.

And still in September's purple and gold he was hunting the grudging ground,
But not with the steady eye of old or the springtime's joyous bound;
If he stopped in his feverish roaming, 't was to question the darkling air;
Too early came the gloaming; he was searching with despair.

And while, for a chance of the rarest, he wanders in storm or heat,
He is blind to the charm of the fairest; he is crushing beneath his feet
The Flower of Every Valley, the Flower of All the Year,
Deep in whose broken blossom the dew lies like a tear.

—Robert Underwood Johnson, in April "Century."

CHEMISTRY OF THE LIVING BODY.

The chemistry of living bodies differs from that of the laboratory in a feature that is peculiar to it—that instead of performing its reactions directly it uses special agents. It employs intermediaries which, while they are not entirely unknown to mineral chemistry, yet rarely intervene in it. If it is desired, for example,

to add a molecule of water to starch to form sugar, the c would do it by heating the starch with acidulated water organism, which is performing this process all the time, o every meal, does it in a different way, without special l and without the acid. A soluble ferment, a diastase or e serves as the oxidizing agent to produce the same result. ing at the beginning and the end, the two operations are the The special agent gives up none of its substance. It with after having accomplished its work, and not a trace of it Here, in the mechanism of the action of these soluble fer resides the mystery, still complete, of vital chemistry. I be conceived that these agents, which leave none of thei stance behind their operations, which suffer no loss, do no to be represented in considerable quantities, however 'gre need may be. They only require time to do their work. most remarkable characteristic of the soluble ferments lies, i here, in the magnitude of the action as contrasted with infi mal proportion of the agent, and the necessity of having for the accomplishment of the operation.—From "Iron in th ing Body," by M. Dastre, in "Appletons' Popular Science M ly" for April.

INEQUALITY IN THE INHERITANCE OF HEALTH.

There is, it is true, as great an inequality in the inherita health as in the heirship of wealth or brains. Some are born a fortune of vigor and soundness so large that not a lifeti eager squandering will leave them poor, and others ente world paupers of need so dire that no charity from medicin ever raise them to comfort; but most of us have just that me legacy of vitality which renders us undistinguishable units i mass. It lies in the hands of each to improve or waste that erty as he chooses, for there are self-made men physically a as financially; those who, because of ancestral wastefulness, only a sixpence of health, and turn it into a fortune; and are spendthrifts of health who come to as sorrowful cas spendthrifts of gold. The body is a realm where a wis frugal ruler brings happiness as surely as a foolish one in distress, and wisdom here, as elsewhere, lies in learning and ing natural laws.—From "A New Law of Health," by Eliz Bisland, in "North American Review" for April.

HEALTH IN THE NAVY.

Good order and discipline, the cleanliness of the ship—nothing, not even the daintiest of summer cottages, is more clean than a well-ordered American warship—were maintained at the camp throughout its entire occupancy by the battalion, and the fact that, although exposed to a malarious climate in the torrid atmosphere of a tropical summer, at a spot located but a few score miles from where our poor fellows of the army were succumbing by hundreds in the fever-laden air, the entire loss of life in the marine battalion was due to the casualties of battle—not one man died of disease—shows what can be done by well-regulated and well-drilled organization in all departments of a military body. There was no lack of medical or other necessities; nothing essential to the efficiency of the force as a fighting body, to its health, to the protection of the men from adverse conditions of life in the field during the rainy season of the tropics, had been neglected or forgotten; and while it is true that the base of supply was close at hand and the problem of transportation inland from the water's edge did not have to be met, it is safe to assume, from the admirable order and system displayed, that any such difficulties presented would have been overcome.—From "Honor to Whom Honor is Due," by R. F. Zogbaum, in "Harper's Magazine" for April.

THE RESULT OF OFFICIAL CORRUPTION IN PHILADELPHIA.

Word comes from Philadelphia that in that city, up to March 10, there had been 3,232 cases of typhoid fever since the beginning of the year, which had yielded 341 deaths. Last year there were 6,097 cases and 639 deaths. A fortnight ago there were 600 cases in the Philadelphia hospitals, and 227 new cases were reported in three days. The prevalence of the disease is attributed to the notorious unwholesomeness of the Philadelphia water, which cannot be improved, because the city government is in such bad hands that proper steps to procure good water cannot be taken. More than a year ago a loan of $3,200,000 was authorized for the improvement of the water-supply of Philadelphia, but the expenditure of the money is in litigation, and nothing has yet been done. A typhoid epidemic is rather a costly remedy for municipal rottenness, but no doubt it will prove effectual if carried far enough. Enough funerals in the streets and enough typhoid cases in hospitals and homes are sure to have

an effect in time, even upon such local politicians as are int with the management of Philadelphia's concerns.—E. S. M in "Harper's Weekly."

VALUES.

The sea, that is neither thine nor mine,
Plotted, nor chartered, nor blocked by line,
The sea, that we cannot smooth, nor hold,
Nor furrow, nor plant, nor buy with gold,
With values growing for bits of earth,
What are the great waste-waters worth?
—Marion Manville Pope in April "Lippincott

REMINISCENCES OF KIPLING.

The issue of "Literature" for March 31, published by H & Brothers, contains the most valuable articles on Rudyard ling that we have yet seen. It is written by the editor India paper, E. Kay Robinson, with whom Kipling was mately associated. Mr. Robinson's attention was first att to Kipling by some of the latter's earlier poems. So muc pressed was he, in fact, with the genius they showed that h vised Kipling to go home to England, where he would be c to make a name for himself.

Kipling's letter in answer is characteristic.

"You ought to know better," he writes, "at your time c than to knock a youngster off his legs in this way; how d expect any one will be able to hold me after your letter? W you be astonished if I told you that I look forward to nc but an Indian journalist's career? Why should I? My h out here; my people are out here. Why should I go home? fool can put up rhymes, and the market is full of boys who undersell me as soon as I put my foot in it." "Let us," he further, "depart our several ways in amity. You to Fleet (where I shall come when I die, if I'm good), and I to my place where I find heat, and smells of oil, and spices, and of temple incense, and sweat and darkness, and dirt, and and cruelty, and—above all—things wonderful and fascin innumerable. Give me time, give me seven years and three to them, and abide the publishment of *Mother Maturin.*"

"*Mother Maturin,*" says Mr. Robinson, "is the great wo which for many years Kipling purposed to make his name

1886 he had three hundred and fifty foolscap pages of its manuscript."

"It was," said Kipling, "the novel which is always being written and yet gets no further."

Robert de la Sizeranne's essay on Caricature, which THE LIVING AGE has translated from the "Revue des Deux Mondes," is an exceedingly brilliant and exhaustive survey of the history and methods of caricature, from the pen of one who never writes without a complete mastery of his subject.

THE APRIL MONIST is more popular than the general run of its predecessors. Prof. G. Sergi, the well-known Italian anthropologist, sets forth in a very clear and intelligible manner the means for distinguishing the various types of human races. Mr. William Romaine Paterson, the well-known English novelist, writes on "The Irony of Jesus," in which the intellectual and distinctively human side of the great teacher is emphasized. Dr. Edmund Montgomery gives a full and competent résumé of Shadworth H. Hodgson's new and voluminous work, "The Metaphysic of Experience." In an illustrated paper on "Yahveh and Manitou," Dr. Paul Carus outlines the analogies which exist between the character of Jehovah, the ancient Israelitish God of the desert, and the great deity of the North American Indians. A study of the "Contemporary Philosophy of France" is offered by Prof. L. Lévy-Bruhl; and numerous book notices in all departments of religious, philosophical and scientific research are added. The Open Court Publishing Company, Chicago.

THE APRIL OPEN COURT is concerned with the "Science of Education." Prof. L. Lévy-Bruhl, of the University of Paris, writes on "Jean Jacques Rousseau," the founder of modern pedagogy, and one of the most interesting and paradoxical figures in the history of modern philosophy. The frontispiece of the number is a fine portrait of Rousseau. "The Education of Parents by Their Children" is the subject of an essay by Dr. Paul Carus. "The Origin of Speech" is treated by Prof. Th. Ribot, the celebrated psychologist. Current questions are discussed by the editor under the heading of "Americanism and Expansion" and "Americanism in the Roman Church." Interesting to students of comparative religion, and to clergymen and theologians, will be the article on "The Cross in Central America," which is pro-

fusely illustrated. Chicago and London: The Open Court lishing Company.

THE ISLAND OF CUBA is the title of a new and attractively trated monthly magazine, beginning January, 1899. Its pr is primarily to represent Cuba and her attractions in lite and scenery, and, besides, to be "A Magazine of the Tro The resources are eminently abundant and attractive; the numbers before us forebode a successful future. A stat study of the recent war, the "machete" and its use, and scenes are just now leading subjects, but some beautiful sc is worked in, and many topics touched upon well calculat stimulate interest in its sphere and enlist contributors to its pose. There is great need in this country for just such inform on the climate and resources of Cuba in particular as this r zine proposes to give, and there should be no lack of patr to the praiseworthy undertaking. Features and departm Island Life—Scientific Writings on Natural History, F ography, Political or Sociological Papers, Education, Et Observations, Customs and Character. Cuban Technical J ress—Building, Engineering and Sanitation. News fro Intertropical World. Tourist's Guide—Useful and Am Hints, Hunting, Landscapes, Sports, Health Resorts, Social Club Life. Cuban Art—Tales, Comic Sketches, Art Notes. letin of the Cuban-American Industrial and Commercial and Institute—Business and Contracting news depart Varieties. The book of the Cuban Ladies—A department ten by women and for women. International Edition, $1 year; 10 cents a copy. Home Edition, Spanish-English, $4 year; 35 cents a copy. Sample Copies on application. Island of Cuba" Publishing Company, 42 O'Reilly street, vana, Cuba.

PUBLICATIONS RECEIVED.

The Antikamnia Fœtation and Parturition Chart. The kamnia Chemical Co., St. Louis, Mo.

Sanjous's Annual, Vol. III. The F. A. Davis Co., Phil phia.

International Medical Annual, 1899. E. B. Treat & Co., New York.

Smithsonian Institution Report for 1897.

Infant Mortality in Massachusetts. By Samuel W. Abbott, M. D., Boston.

Thirty Poisonous Plants of the United States. By V. K. Chestnut, U. S. Department of Agriculture, Washington, D. C.

Absorption *versus* the Digestion of Milk. By L. Duncan Bulkley, M. D., New York.

Abdominal Section on a Patient Suffering from Exophthalmic Goitre. By Charles P. Noble, M. D., Philadelphia.

Ligatures and Sutures. Ibid.

Clinical Report from the Wiwjah Sanitarium. Karl von Ruck, M. D., Asheville, N. C.

Diseases of the Alimentary Canal—Treatment. By Jas. Osborne De Courcy, M. D., St. Louis, Mo.

Treatment of Ulcers; Malignant Sore Throat and Its Treatment. Ibid.

Sanitarium Treatment of Pulmonary Tuberculosis. By J. Edwards Stewart, M. D., and Stephen W. Wells, M. D. Loomis Sanitarium, Liberty, N. Y.

Reduction of Obesity. William T. Cathell, M. D., Baltimore, Md.

The Teaching of Physiology in Medical Schools. By W. T. Porter, M. D., Boston, Mass.

The Disposal of Refuse and Garbage. By W. F. Morse, S. E., New York.

ANNOUNCEMENTS.

AMERICAN CLIMATOLOGICAL ASSOCIATION.

The sixteenth annual meeting of the association will be held in the Hall of the Academy of Medicine, No. 17 West Forty-third street, New York City, on May 9, 10 and 11, 1899.

Opening address May 9, 1899, at 10.30 A. M., by the President, Dr. Beverley Robinson, of New York.

The sessions each day will be from 10.30 A. M. until 1.30 P. M. and from 3 until 6 P. M.

The Council recommends that papers should not exceed fifteen

minutes in reading, and that members, in discussion, be lim
five minutes, unless special permission be granted; that me
send to the secretary, not later than April 1, the title o
paper, and, if possible, a synopsis which will facilitate disc
and that members have duplicate copies of their papers, so th
copy may be deposited with the secretary immediately after
read. Papers should be confined strictly to "climatolog
hydrology and diseases of the respiratory and circulatory or

A smoker, at Delmonico's, northeast corner of Forty-
street and Fifth avenue, will be tendered to the association
evening of the first day, and the annual dinner will take pl
the evening of the second day.

A trip to the Loomis Sanitarium, at Liberty, N. Y., will
ranged for the third day of the meeting, May 11. It is de
to know as far in advance as possible the names of membe
will join in (*a*) the dinner; (*b*) the trip to Liberty. A
train on the New York, Ontario and Western Railroad will b
vided by the courtesy of the railroad. The train will leave a
A. M. and return to New York, arriving about 9.30 P. M.
bers will be provided with schedules later, and can, if they c
make direct connections at Liberty for Central New York a
West.

CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEAL
NORTH AMERICA.

The Fourteenth annual conference of this organization w
held at Richmond, Va., May 23 and 24.

J. N. HURTY, M. D.,
Secretary, Indianapolis,

AMERICAN MEDICAL ASSOCIATION.

The fifteenth annual session will be held in Columbus, Oh
Tuesday, Wednesday, Thursday and Friday, June 6, 7, 8 a
commencing on Tuesday, at 11 A. M.

"The delegates shall receive their appointment from perma
organized State medical societies, and such county and d
medical societies *as are recognized by representation in the
spective State societies,* and from the medical departments
army, navy and marine hospital service of the United States.

"Each State, county and district medical society entitled t

resentation shall have the privilege of sending to the association one delegate for every ten of its regular resident members and one for every additional fraction of more than half that number: *Provided*, however, that the number of delegates for any particular State, Territory, county, city or town shall not exceed the ratio of one in ten of the resident physicians who may have signed the Code of Ethics of the association."

Members by Application.—Members by application shall consist of such members of the State, county and district medical societies entitled to representation in this association as shall make application in writing to the treasurer and accompany said application with a certificate of good standing, signed by the president and secretary of the society of which they are members, and the amount of the annual membership fee, $5. They shall have their names upon the roll and have all the rights and privileges accorded to *permanent* members, and shall retain their membership upon the same terms.

BUREAU OF THE MEDICAL PRESS.

It has long been a subject of comment that the medical journals were slow to appreciate the advantages and benefits to be derived from a representation at the National and State Medical Society meetings. The fact that a half dozen journals are rarely seen at the meetings of the American Medical Association reflects a marked indifference to this advantage. But it can hardly be questioned that the society meeting affords an excellent opportunity for a journal to get in touch with both the profession and the advertiser, and this plan, if systematically followed, will ultimately insure a degree of success difficult of attainment in any other way. We are, therefore, pleased to announce that the bureau service inaugurated by Mr. Chas. Wood Fasset several years ago will be continued at the American Medical Association meeting in Columbus, June 6 to 9. A catalogue edition of the "American Medical Journalist" will be issued, containing a descriptive index to the medical periodicals and reference books contained in the bureau, and advertising matter of various kinds will be distributed for members.

OMITTED—By overrun in this number—articles named under Contents: "Paris Exposition of 1900;" "The Hundred Year Club;" Non-Committal."

THE SANITARIAN.

JUNE, 1899.

NUMBER 355.

FOOD ADULTERATION.

According to Dr. H. W. Wiley, chief chemist of the United States Department of Agriculture, who gave testimony before the Senatorial Pure Food Investigating Committee, at Chicago, May 3-4, fully 90 per cent. of the articles of food and drink manufactured and used in this country are fraudulent.

In milk, according to his testimony, the most common practice is the abstraction of the fatty substance in taking away the cream. A common practice among dealers, he said, was the adulteration with water, and in addition to this preservatives are used to no small extent to prevent the liquid from souring.

In butter the common way of defrauding the public, according to the testimony, was the substitution of other fats, both animal and vegetable, for the natural fat of the milk. Both cottonseed oil and high grades of lard were employed in this work. Honey, Dr. Wiley said, probably was a more abused article in the line of adulteration than any other.

The principal method of adulterating lard is the mixing of vegetable [illegible] with the natural fat of the hog. Fats and oils, he said, instead of being injurious to the health, are wholesome to a great degree. All kinds of pure oils, he said, were heating to the system as well as great aids to digestion. Another fraud which is carried on to a very great extent is the selling of cottonseed oil for olive oils.

Probably among all the foods mentioned by Dr. Wiley none attracted greater attention than the adulteration of coffee, even in the berry. According to the witness, in recent investigations he has found molasses and flour molded into berries, colored, mixed with the genuine, and sold as high-grade coffee.

According to Dr. Wiley, there is very little pure beer made in this country. Fully 70 per cent. of the beer which is sold in this country is made of some article other than malt. In regard to the extensive use of glucose, the witness said that it was not objectionable for food purposes, if used in moderation.

Very little pure jelly is manufactured, he said. There also is a great amount of adulteration in the manufacture of vinegar.

Dr. Wiley said Vermont maple sugar was manufactured in Davenport, Iowa, out of brown sugar and an extract of hickory bark, and it was not deleterious. In fact, he said it was impossible for chemists to distinguish the two. The sugar was the same, and the natural ether that gave the maple sugar its flavor and distinctive quality was too infinitesimal to segregate in an analysis. The extract of hickory, he said, was about the same as the maple flavor. Peanut shells, he declared, were palmed off as ground cinnamon.

Among practices that are fraudulent, yet not injurious to health, he mentioned the sale of fish of cheap variety and grade for more expensive kinds, especially fish packed in oil. It was also a common custom for dealers to stamp packages with foreign stamps, and thus deceive the public into believing it was buying imported goods. The sale of turtles in restaurants for terrapin was also a common means of defrauding the public. Famous wines and other drinks of foreign countries, that "never even saw the color of the ocean," he said, were on sale in American markets.

The witness said that adulterations of food and drink injurious to the public health could be classed in two groups—coloring and preserving. The methods of coloring green vegetables were spoken of in detail. The matter which is used mainly in restoring the natural color of green peas, Dr. Wiley declared, was sometimes salts of zinc and sometimes salts of copper, either of which is poisonous, and the use of which should not be permitted. Probably the most common chemical used as a preservative is salicylic acid. It should not be permitted, he stated, because it is injurious, especially to those who have weak stomachs. He ended his testimony regarding the subject by saying that no food which contained preservatives was fit to eat.

Giles Lewis, a druggist of Chicago, stated that while other countries had laws which prevented the selling of adulterated goods in their own countries, no provisions were made against exporting them to foreign countries. He said that the United States received articles of food made in Germany and France that would not be used in the country where they were made, because of the

preservatives employed. Special mention was made by him o privileges of German manufacturers who are permitted to s the United States, without hindrance, articles of food which not be sold in Germany.

MILK?

At a meeting of the Board of Aldermen of Fall River, M April 24, a hearing was given to the Fall River Medical Soc who had petitioned to be heard, on the subject of protecting preserving the milk supply. Most of the members of the So were present and a large representation of the leading citizens cluding a number of ladies. The Mayor presided.

Dr. Richard J. Thompson said, in opening the proceedings, the subject of poor milk supply in Fall River had been fo upon the attention of physicians in their practice. The m had received much attention from them. It was a very ser thing, and they appeared before the board to present facts of c mon knowledge, and in hope of securing a change in conditi They had asked for the hearing now because the summer closely at hand, and in that season conditions were at their w The facts were often repulsive, but to secure proper atten consideration of the matter must be given. The Medical Soc proposed to send out to dealers and consumers, for the latter as often at fault as the former, carefully prepared rules for proper care and preservation of milk.

He then introduced Dr. Thomas E. Maloney, Veterinai who would address them on—

THE CONDITIONS OF THE COWS THAT GIVE THE MILK, AND I THESE CONDITIONS MAY AFFECT THE MILK.

Dr. Maloney said to tell what constituted proper care was e to tell of all the improper conditions existing would take up n time than could then be devoted to the subject. Pure milk wa be secured only from healthy, well fed, kindly treated c Cows suffering from disease of any sort could not give good n Any abnormal condition of the cow affected the milk. The

might be altered physically, chemically or pathologically. Milk could be watery when it had not been adulterated. Milk that was watery or bloody was physically affected. When chemically altered there were changes such as those produced by fermenting and souring. Pathologically altered milk was either the carrier of disease, or diseased milk itself. Impure milk would come from unhealthy, badly kept or unkindly treated cows. It would come from cows kept in badly located, ill-lighted, poorly ventilated or improperly drained quarters. Bad attendance of milch cows resulted in impure milk. This might be through unkind treatment, or through lack of cleanliness in the condition of the cow or attendant or both.

Unsuitable pastures produced poor milk. Cows should not be allowed to drink from stagnant pools, but must, to be healthy and give pure milk, have an abundance of clean, pure water. They must have clean, healthy food, not swill nor musty, stale, highly fermented food. Such food impaired digestion and made the cow unhealthy. The presence of such food in the place of milking readily infected milk. Cows pastured on dumping grounds for offal must give impure milk.

Pure milk never came from an unclean milk room. No clean milk room could be connected with a stable or other building. Milk from a cow within 30 days before calving or within five days after calving should not be used. The milk was at that period known as colostrum and was fit only for newly born calves. Cows suffered from many diseases, and the possibilities of their giving to man those that were infectious were very well known. Milk from a cow suffering from an infectious disease was not only impure, but poisonous. Such conditions as he had stated to be improper did exist, and were more frequent than sufficed them to be characterized as exceptions. From these conditions two classes suffered, the consumers and the farmers. The consumer received impure milk; the farmer who cared properly for his cows and milk suffered from competition with men who did not properly care for either cows or milk. Every cow should be registered or licensed, whether it were kept for private use of the milk or to furnish milk for public supply. The condition of issue of the license should depend as much upon the keeper of the cow and the place in which it was kept as upon the condition of the cow. The cow was not primarily at fault for giving impure milk.

Dr. William A. Dolan had the subject:

THE COW IN THE COUNTRY, THE PLACE AND THE WAY OF MIL HER.

He said that in many cases the cows were kept in fields became covered with dirt and dust. If there were pools and dles they were frequently covered with mud. In summer were covered with flies bringing disease. In the winter they kept in a close, ill-lighted, poorly ventilated, unwholesome st often with the dust for bedding, lying in urine and manure plastered their bodies. Under these conditions they were proached to be milked by the milk-man. Much of the dirt collected with the milk in the process. If his hands were di was apt to wet them with streams of milk. His hands ma may not have been clean. The streams that wet them conti into the pail. Much of this dirt and filth found its way int milk through carelessness. Milk was a fluid which probabl sorbed more readily than any other fluid. In the country it often kept in the cellar, that was seldom if ever drained. T it absorbed the musty air, the odor and taint of decaying tables. These conditions and similar unhealthful and impr ones were to be seen every day, not necessarily in the stable, w the swill fed cow was kept, but in the stable of the man who tends to deal in only good, pure milk.

Dr. Benjamin J. Handy spoke on the subject:

MILK UNTIL IT STARTS ON ITS WAY TO BE SOLD.

He said that very often the persons handling the milk wer clean themselves, and were careless about keeping the milk c The milk was stowed in improper places. The wagons were dirty, at times filthy. There were frequently cases of sickne the dairyman's family. He should be required to at once r all such cases to the board of health. Cans were impro cleansed. He had known of two quarts of warm water l made to do for eight cans. The milking pail was used time time, and the milk from one milking stranied through the of previous strainings. These sources furnished filth from side. Then milk through improper treatment was allowed tc ment. There was not a physician present who would obje an advance in the price of milk, provided the advance would more assurance of pure milk. Milk could be preserved an livered in a state practically pure. One regulation that sl

be insisted upon was that all cases of disease in the family of a farmer who furnished milk should be reported promptly to the board of health.

Dr. Arthur I. Connell spoke on the subject:

THE COW IN THE CITY; ALSO, HOW DISEASES MAY GET INTO MILK.

He said that there were many men who, as all their time was not taken up with their employment, kept a cow or two for personal convenience and to help out their own incomes. They supplied themselves and their neighbors with milk. As a rule the cows so owned were not properly kept. The sheds in which they were housed were poorly ventilated and lighted and often there was hardly room for them to turn. Flies bothered them. The manure was allowed to collect and stand in the stalls or about the shed. Milk produced under such conditions must be contaminated. The cows had no exercise, except as the owner's time allowed, and even then, perhaps, when his conscience forced him to act. The keeping of a cow was not a business with him, but merely a side issue, taken up to eke out his income. In the demands of regular employment the cow might be regularly watered and fed or it might not. It might be allowed to wander about the yard finding water for itself. The water then might very easily be stagnant, foul and contaminated. Speaking of the possibilities of diseases entering into the milk, Dr. Connell said that diseased udders of cows were a very prolific source of disease to human beings. Then he had seen eczema and itch on the hands of men who brought large quantities of milk to the city. Think of drinking milk from cows milked by hands in such a condition! Scarlet fever might show itself only when the skin was peeling. Should there be a slight case of this disease on a farm it was not unlikely that when the skin of the patient began to peel, he would be regarded, through ignorance, as being entirely cured, and beyond the state where contagion was possible. Such a person might in the peeling state be allowed to resume his work of milking, when as a matter of fact the danger of contagion was greatest. The milk wagon should be a suitable vehicle for carrying milk. It should be kept clean and neat and as cool as practicable. The cans should be filled to the brim to prevent shaking up as much as possible. Glass jars, which were now much used, were better

than cans if the milk were thoroughly cleansed and cooled l being put into them. Unless the milk were so treated cans to the brim and tightly closed were better than jars. In pi ing covering for the cans much carelessness was shown. A carpet, or a horse blanket worn beyond its intended use, was considered sufficient.

Dr. George L. Richards spoke on the subject:

ADULTERATION.

He first said that milk was a complex organic fluid compo: water, fat (the cream), sugar and a number of salts. It v in specific gravity and in color. It was easy to diminish th portion of solids in rich milk with little chance of detection. only means of detecting such diminishing was with a lacto an instrument used to measure the amounts of solids in There were limits fixed, and milk rich with cream would allo addition of considerable water before this limit was reached. fault of low specific gravity of milk was at times with the Adulteration of milk was done with the purpose of makir milk go farther. The element mostly used in adulteratio water. Except that it constituted stealing from the cons this use of water was harmless, providing the water was In Pennsylvania he had known of a case in which the wate contained typhoid fever germs, and an epidemic resulted. and water were sometimes used to adulterate. Taking the from the milk he considered more harmful than to adul with water. There was an instrument coming into use a farmers, slowly because it was expensive, which by a centr method extracted nearly every bit of cream without waitir the milk to stand. The milk left contained as much bon ducing quality as formerly, but was robbed of its fat. night's milk had its cream taken from it, and was mixed wi next morning's milk, and all delivered as morning's milk. inspector should know all about the manner of handling o by producers and dealers. Much of the milk delivered wa plied by dealers who did not produce it. The Connecticut E ment Station had found that the milk sold from groceries v lower standard than that delivered by milkmen. Grocery should receive attention.

Dr. J. H. Jackson spoke on:

CITY SELLERS AND PEDDLERS OF MILK.

He said that cows in the city suffered from lack of care, bad quarters, lack of knowledge on the part of their keepers of what constitutes proper care and attendance by persons unaccustomed to the care of cows. Milk was contaminated through being handled by persons having no knowledge of its proper care, and without means to give it that care. About 5,000 quarts of milk were produced daily within the city, and the greater part of it from improper surroundings and conditions. Seven hundred to 800 cows were wandering about the suburbs living upon whatever vegetation there might be there. The food was often improper and more often inadequate. Such supply of food vitiated the milk which supplied approximately one-tenth of the population, and affected the health of that proportion of the population. The cows were covered with scales of filth. This filth must get in more or less quantity into the milk pails. The cows went through the process of milking with dirty hands. The milk was kept in improper places, perhaps in bedrooms, and in open pans or open cans. In talking to a man who supplied milk he had suggested that adulteration with chalk and water was practised. The dealer denied the chalk, saying that chalk cost too much. The doctor had seen milk kept in bedrooms where people slept and where they were sick. He had known of its being kept in cellars under dirty houses with vegetables decaying and steaming about it. This milk was brought to small dealers. In one instance where he had bought milk in such a place, it was in a loosely corked can in a cellar surrounded by rotting apples and by onions and turnips. Assurance was given that certain milk was one cow's milk, and so all right for the baby. If the surroundings in which the cow and milk were kept were such as he had described, this one cow's milk would be much worse for the baby than mixed milk would be. If any portion of the milk were bad, it would be all bad, and it killed where it went. How could proper care be expected from men not trained to care for cows and milk? In adulterating he knew that a substance called butter color was used to give the milk a rich color. This substance was sold to milk dealers by druggists. Soda was used to prevent the milk from souring. The milk was in a worse condition when kept in a close place than it would have been if soda were used. One practice that should be abolished was that of having milk left standing outside for hours in the early morning

in the heat of summer days. If things were as he had desci and he knew them to be so from personal observation, there need of protection. He had tried all sorts of dealers and paid prices to insure a supply of pure milk, and never succeeded i curing it. The whole supply was poor enough, and God sa from it.

Dr. George S. Eddy spoke on:

TUBERCULOSIS.

He said that the State board of health had some time ago (the attention of the local board of health to the fact that the (rate of Fall River was higher than that of any other city i State similarly situated and conditioned. This was particu true of its infant mortality. Tuberculosis in cows was knov exist very extensively in this and in other countries. In the ern and northern States it was estimated at from 20 to 40 per Forty per cent. was large. It included cases where the di had been detected and the cows killed. He believed 20 per to be a fair estimate. There was a large percentage abroa countries where the inspection was close. It was a known fac with the establishment of strict and close inspection the perce of cows affected with the disease was reduced. Great part (fant mortality was due to tuberculosis. The diseased glan different kind so often existing were really tuberculosis. P cians were interested to know where infants got tuberculosi was now established as a fact that while they could inherit ceptibly to the disease, comparatively few inherited the di The germs must be swallowed or taken into the system in other way. As infants lived entirely or almost entirely upon the natural conclusion was that their tuberculosis came la from the milk. Rigid examination of cows should be req This was not required now. It had been demonstrated that t culous milk injected under the skin of another animal would duce the disease in that animal. There must be more interest by the authorities in the milk and meat supply with the obj avoiding this disease. It was in bad quarters that consum thrived. A cow in bad quarters, not properly fed and care became weakened and in that condition took in the germs such a condition the germs thrived in the cow. No person was consumptive should be brought into contact with co

milk at any time. Healthful surroundings for the cow, eradication of diseased cows, elimination of diseased persons from handling the cows in milk were all necessary to control and reduce the amount of tuberculosis.

Dr. Michael Kelly spoke on:

THE RELATION OF THE INFANT AND SICK PEOPLE TO THE MILK SUPPLY.

He said that the infant during its first year depended almost wholly upon milk for food. It could hardly digest anything else. The best food was the mother's milk, and infants who could have this were blessed. The mother's milk was to be taken as a standard. Unfortunately, the number of children dependent upon artificial feeding was increasing, because of the increase of the number of mothers who for one cause or another could not nurse their children. The child at three or four months, or at the oldest, six months, had all the elements in its composition to make it healthy or weak for all time to come. So all attention possible should be given to the proper nourishment of children. Poorly nourished children were susceptible to diseases, recovered from them slowly, as a rule they grew up poor citizens, weak physically and mentally. The best substitute for the mother's milk, it was universally agreed, was good, pure, healthy cows' milk, properly prepared. Nothing else stood second or third to cows' milk as a substitute for the mother's milk. Patent foods existed and were used because people were afraid of cows' milk for the good reasons already given. Children fed on patent foods were not getting their just share of what was owing to them. Since so many infant lives were dependent upon cows' milk, it was very important that the milk should be good. By science they had been taught to analyze milk. There was hardly a fact about it that should be known that could not be learned. Infants should get the benefit of this knowledge. Bad, impure, adulterated or contaminated milk must have a very injurious effect upon young children. It was often insidious in its effects. The child did not at once show that anything was wrong, and when it did the milk, carefully prepared, was the last cause suspected. By the time that the cause was discovered the child was liable to have reached a state in which it would take permanent disease. Children with such troubles, stomach and intestinal trouble, usually were slow in all

bodily development. Watered milk weakened the quality ar sulted in the giving of an infant such an excessive quanti secure the proper amount of nourishment as to overloa stomach. Slow growth and poor development were due t milk. In Fall River 25 per cent. of the deaths were infant young children. These deaths were largely due to intestina stomach trouble. These were recognized as preventable dis The hearing had been called, he understood, to attempt to s means of preventing these diseases and the large number o necessary deaths. The supply of pure milk was a matter of importance to adult invalids who lived wholly or very la upon milk.

Dr. C. A. Hicks, of the board of health, was called upon to the story of a specific case, in which an epidemic of typhoid was caused by a case in the home of a seller of milk. The ca said, was known to all boards of health throughout the St "the Portuguese case in Fall River." About two years ago had been a contagion of typhoid fever among some Portu residents. As agent for the board of health he investigate cases, but made very slow progress. He inquired in every f of the source of milk supply, and learned that one milkmar plied them all. He found that the cows were kept in two she one of which they were so crowded that they had to take turns down. There was no ventilation, and being a cold day, the were covered with frost. There was lying in and about the the excrement of months of accumulation. The tenement in the man lived consisted of one living room about 16 by 16 an or three sleeping rooms. The mother was washing clothes i room. On a table near the stove were four or five cans of The stoppers were out. In a sleeping room on a bed filthy b description was lying a young man ill with typhoid fever. nose had been bleeding freely and the blood was all about. doctor said that he had never seen a more ungodly sight in life. He had the milk emptied out. The board had no jur tion, and he had to put up a "bluff," which worked. There nine cases of typhoid fever, all in families supplied with this There were two deaths, one that of the young man found ill. other was that of the mother of three young children, who left with no one to care for them but their father, who e barely enough to supply poor food for them. This man ha known where the milk supplied his family had been secured

Dr. J. H. Gifford had the subject:

MORTALITY STATISTICS OF CITIES BEFORE AND AFTER A SYSTEM OF SUPERVISION OF MILK SUPPLY HAS BEEN CARRIED OUT.

He had a set of charts to illustrate his statements. In a list of cities of the State, Fall River's death was shown to be in excess in percentage of the population of any other city. Waltham had the lowest rate. Fall River's rate was shown to be nearly twice as large as that of Worcester. It was larger than those of New Bedford, Lowell and Lawrence, the proportion of the rates of those cities to Fall River's rate benig about 8 to 11. The excessive death rate in Fall River was confined to infants. The rate of deaths of older persons compared favorably with the rates of other cities. The average death rate of Fall River was twice that of other cities. There was reason for this. Fall River was salubriously situated, with surroundings good for health, drainage naturally good and a water supply the equal of any in the country. One of the chief causes of the high death rate was a defective and impure milk supply. It appeared that there were in Fall River as compared with other cities 500 needless deaths, annually. These deaths were largely of infants. Dr. Gifford exhibited a chart showing the effect upon the quality of milk supplied Chicago on the adoption of a system of inspection. In 1892 the system was instituted, and in 1893 put in charge of the board of health. When inspection was begun nearly half the supply was found to be adulterated. This dropped steadily until difficulty in securing convictions was encountered. Then the adulteration increased rapidly. The plan of reporting to the press cases of arrest and the seizure of adulterated milk was adopted and the number of cases dropped to one in 10 and even to one in 20. These facts proved that inspection produced a more satisfactory condition of the milk. Another chart showed a steady decrease in the death rate of Chicago during the five years that milk inspection had been in active practice. He hoped that such a thing were possible in Fall River. If it were, they were justified in coming to the board and asking for protection for helpless infants and that their lives be saved. They came as a matter of humanity, not politics, to ask that the little ones be allowed to live and thrive, instead of being allowed to die or grow up weak and diseased.

Dr. John W. Coughlin's subject was:

WHAT THE PROBLEM MEANS TO THE LABORING MAN.

He said that there was no question of wider significance to be discussed than the one before the board. They might discuss sew-

ers and highways, but the health of infants stood ahead of
In the homes of those who labored the mother had to go
work and left her infant to the care of some one else. The
cried, as was natural for infants to do. It should often be a
to cry; it was all right. The moment the child did cry, tl
the attendant gave it the bottle to quiet its cries. The bott
probably dirty, the milk having been left standing probabl
not unlikely impure and contaminated when delivered. H
seen a number of cases of death, which he believed to be d
rectly to poor milk. No exact rule for treatment of infants
be laid down. Physicians could in part protect infants fron
bottles. The authorities should protect them from bad milk
gathering was held not to arraign any particular milkm
dealer, but to have adopted a general means for protection o
supply. He believed that the man who adulterated milk
was to be given to a helpless, innocent child was guilty of the
form of murder. There were not now sufficient safeguards
homes of poor people needed protection. It was the duty
government and of the medical profession to see that step
taken to bring about a change. The general impurity of mi
no fault of the individual. The mayor, he knew, was interes
a physician, in the subject. He believed that the board
take equal interest. Something was wrong in the system th
been followed for years. There was something sordid and
in a traffic in the possibility of killing infants.

Dr. Thompson said that there had been carefully drav
several years ago, by representatives of different boards of
of Massachusetts an act for government of the milk supply
protection. He asked Dr. Hicks to read the law.

Dr. Hicks said that the act had been two years in formu
Professor Sedgewick had given valuable aid to it. After be
cepted by the general society, the committee on legislation ha
authorized to go before the Legislature to attempt to sec
enactment of the law desired. A stumbling block was encou
The farmer feared an infringement of his rights, not re
that under present conditions he was inviting outside com
from manufacturers of condensed milk, malted milk anc
milk products. Three quarters of a million cans of con
milk were sold annually in Fall River.

After reading the proposed act, Dr. Hicks told how tl
board of health had stopped quite a prevalent practice of c
swill and milk in the same wagons. The board prohibi

carrying of swill or offal in any except licensed wagons. Then it would not license milk wagons to carry swill or offal. Dr. Hicks spoke of an instance of milk from a celebrated dairy farm in Fairfield, N. J., being carried across the Atlantic to insure an unchanged food for a weak infant. The milk not used was brought back and kept closed in a refrigerator until 30 days had passed since it was given by the cow. Then it was drunk at a dinner of physicians and found to be sweet and pure. He cited this case to show that milk could, with proper care, be kept pure.

In conclusion, Dr. Thompson said that the Fall River Medical Society asked that action be taken in the matter, and that the rules and regulations read by Dr. Hicks either in their present form or changed, or other suitable rules and regulations for protection of the milk supply be adopted. Also, that the board of health, or some other suitable body, be empowered to carry out the rules adopted.

The mayor thanked the physicians for the thorough manner in which they had presented their subject, and the hearing was adjourned.

SLOP FEEDS.—For the human subject in weak pathological conditions what are known as spoon-victuals temporarily serve a good purpose, but when the individual is in a normal state of health such foods lead to degeneracy of tissue—tabes.

Similar pronounced effects are produced upon domestic animals when fed upon slop stuffs, and if confined to such foods cows become feverish, flow of milk is much increased, hair falls off, and with evident general derangement of health; blood circulation becomes so impaired and so impoverished that the tails become gangrenous and slough off. The milk of cows so fed becomes pathalogical and unwholesome as food.

In case of swine similar pathological changes take place, and if slaughtered there is found to be a peculiar oiliness in the fat which makes the meat more or less unpalatable, according to the length of time such feed has been given, and difficult to preserve.

Great numbers of cattle and hogs are fattened for slaughtering on still-slop. The meat of such animals is of an inferior quality, and in many instances is positively detrimental to health.

The recent Government inquiry into the quality of beef fed the army during the late war should bring up a suspicion that the beef sold to the army, which is proven to have been of an inferior

quality, may have been of distillery slop-fed stock. The meat such cattle and hogs certainly would be more difficult to pre fresh in tropic climes than that produced from grass, hay, grain-fed stock. Wholesome food is necessary to nourish keep in good health the consumer.

Pure food commissioners and health authorities should cognizance of the health and previous feeding of all an slaughtered for food, as well as of the milk given by cows f foods which produce such feverish conditions as those menti Members of the medical profession should not be slow to dire tention to this vital question.—Lancet-Clinic, April 15, 1899

SOME COMMON SOURCES OF IMPURITY IN CC TRY HOUSES.

By Harvey B. Bashore, M. D.

The delusions which our ancestors used to have in rega the purity of the country house is fast vanishing. Even the posed pure air of the isolated farm house must disappear b the facts of an unprejudiced science. I do not fear to mak assertion that there is hardly a village or country house any which does not offer more sources of impurity than the ord city house.

The average city dwelling, especially of modern constru has a comparatively dry and impervious foundation, and t just the opposite of the conditions existing in the country.

I have watched the building of many modern houses on hattan Island and I know personally that there, at least, som is taken to get a dry foundation. In the country the usual m is to dig a hole the required size, wall this with stones and tar, and on this erect the superstructure, without any pr tions being taken to favor dryness. As a result of this m country houses have almost invariably damp cellars. In a house about the only other points of impurity are the kitcher and the bath room; but these rarely ever breed the trouble t likely to arise from the old privy and the befouled soil ab village house. In a great many country places the kitchen is the equivalent of the "sink," and the soil surrounding comes literally clogged with filth. Nitrification is delayed a hot weather the odors of putrifaction pollute the air; not o

there discomfort, but there is danger, for the filthy wash and kitchen waters drain into the well and poison the water. In the winter, when the surface soil becomes frozen, the air from the filthy soil is drawn into the cellar and from there ascends into the living apartments of the house.

In this filth-laden soil germs of all sorts and conditions live and thrive, and carry on their ceaseless work for good or evil—most often for the latter. I remember two such places in which the conditions were exceptionally bad in regard to the soil surrounding the house, and in both these dwellings the inmates were almost continually sick from one thing or another. The well water of both places was examined, but neither showed excessive pollution. The filthy condition of the soil alone was evidently the chief factor in making these families sick.

Cellars in country houses furnish another source of impurity, not only by being pervious and damp, but by being the receptacle for decaying wood, vegetables, etc. Then, too, the absence of sunlight—a characteristic of cellars—favors bacterial growth. The housewife keeps her cellar dark because in summer it will be cooler, and in winter the so-called windows are boarded up to keep out the cold. Cellars should be kept just as clean as any other part of the house and should have proper-sized windows to let in the sunlight. The sun is one of the greatest germ destroyers we have and is superior to all other germicides in that it costs nothing.

A bacteriologist of one of the Canadian agricultural stations recently made a very interesting experiment on this line. An Agar plate was inoculated with colon bacillus and then covered with heavy black paper in which the word "sunlight" was cut. It was then exposed to the direct rays of the sun for six hours. The sun's rays destroyed all bacteria over the exposed letters, while on the unexposed part the bacteria developed as usual. In the midst of this flourishing colon vegetation the lifeless letters stood out almost as plainly as if printed.

Chicken-yards and pig-pens are other fruitful sources of filth. The State boards of health, especially in Pennsylvania, are taking cognizance of such places, and in numberless instances these abodes of impurity have been remedied. The elevation of the pens a foot or two above the soil, the daily removal of the filth and its covering with earth, and a plentiful supply of whitewash will abolish the trouble arising from this source.

The compost-heap is a frequent nuisance. Quite often the ash pile and the compost-heap are united. If the kitchen refuse is put

into a hole on the garden bed and covered with a little earth, from time to time, there will be no decomposing filth to pollute the air. Then, too, the ashes will be clean and may be used for making paths or for foundations under pavements.

Another impurity surrounding the country house was brought to my notice last year, while taking a bicycle ride through one of the most fertile valleys of Pennsylvania—the "duck ponds"—which seemed to be a necessary adjunct of all the farm houses in that particular locality. These ponds are simply stagnant pools, generally adjoining the barn yard. The name indicates their use, and filthier spots I have rarely ever seen. A salt water marsh is a thing of purity compared to these ponds.

So much has been said about the country well that it only needs a word in this purview. The country people love their "old wells." They always tell you: "Why, nobody ever got sick from our well!" I came across just such a well within the last few months. Three generations back this old well furnished water for the same family, and no one, in fact, ever became sick from it. At last the old folks died and the second generation started on their way with a large family of sons and daughters. Still no one became sick. The third generation became men and women and still resided at the old homestead; then, at last, after so many years, the old well began its deadly work. One after another of the family was stricken with typhoid fever until four were ill at one time, and that homestead will never be the same it once was, for there are two vacant places, and this old well, which before had "never made any one sick," yielded on chemical examination 17.0 parts of chlorine per 100,000—not far removed from dilute sewage.

The allurements of the "Old Homestead" seem very enticing on the stage or on canvas, but under the exacting eye of the sanitarian, with his increased angle of vision, "things are not always what they seem."

The vine-clad porch, with its wistaria and fragrant honeysuckle, where "mother used to sit," resolves itself into a damp, musty, sunless nursery of "the chronic rheumatism which made mother's life a burden." The old well, with its "pure, sweet water," has become a vast test-tube of colon bacillus at least, if none other, and the delightfully pure air, redolent with the perfume of flowers, has become an air surcharged with moisture reeking with the gases of decomposition, from a befouled soil and a cellar soil and air saturated with the mouldy debris of decayed vegetables. Such is not rarely the true story of the "Old Homestead."

THE MALARIA PROBLEM IN THE LIGHT OF EPIDEMIOLOGY.*

By Andrew Davidson, M. D.

Lecturer on Tropical Diseases, School of Medicine, Edinburgh.

In what form does the plasmodium of malaria exist outside the human body, and in what way is the infection communicated to man? Is it present as a soil-protozoon in malarious localities, or is it a parasite of some species of suctorial insects or of some vegetable organism peculiar to malarious districts? and by what agency or vehicle, and through what port, does it effect its entrance into the economy? This, to my mind, is the malaria problem, on the solution of which depend our hopes of effectually combating this most destructive of tropical diseases.

The search for the plasmodium outside man has hitherto proved fruitless. We do not know where to look for it, whether in the soil, or in the water, or in the air, or in some animal or vegetable organism. Even if we had it under the microscope, we should not be able to identify it, for we do not know in what form it may be present in the surroundings of man. We have hitherto been groping blindly after it, now in this direction, now in that, without any clue to guide us in our search.

It was left to our president, Dr. Manson, tentatively to advance the hypothesis that the plasmodium is a normal parasite of the mosquito or of some other suctorial insect, "passing from mosquito to larva, and from larva to mosquito in never-ending series." The pools in which the malaria-infected insects die become contaminated, and the parasite may be swallowed in water by man. The mosquito-haunted pools dry up; the dried sediment containing plasmodia is blown about by winds and currents of air, and may thus be inhaled by man. Besides, "many mosquitoes die without getting to water; all male mosquitoes die without seeking water. The bodies of such mosquitoes fall in time on the soil and decompose. The parasites they contain pass into the resting-stage, and in this form they may be carried into the air by currents, or be blown about as dust, or be shaken out by man when he disturbs

*Read before the British Medical Association, July 27, 1898.

the soil. In this way, too, the plasmodium may find a route to man. In this way, too, we may explain the occurrence of those cases of malaria which apparently, though not really, are unconnected with swamp or stagnant water." According to this view, man is an occasional host of the plasmodium, and it is removed from the circulation of this host by the mosquito, within which it develops. The human infection, however, is only an episode, so to speak, in the life-history of the parasite. Its main cycle is completed in its insect host. Ross' researches further point to the conclusion that each form of parasite has its own appropriate species of mosquito in which alone it can develop. A dapple-winged insect he believes to be the host of the crescent-forming parasite; a barred-backed one, that of the tertian parasite.

This hypothesis is clearly a good working one; for it is one which can be verified by actual observation and experiment. It gives us a clue to follow, namely, the fate of the parasite in the mosquito fed on malarial blood; and the researches of Ross, to which we have referred, justify the hope that in following this clue we shall be brought sensibly nearer to the solution of the problem as I have stated it.

This hypothesis has given birth to others. Bignami suggests that the malaria germ, present in malarious localities as a soil-parasite, is inoculated into man by the mosquito and allied species of insects which deposit their ova in water or in humid places. Koch, who fully recognizes the weight of the evidence implicating the mosquito in the malarial process, and mentions the interesting fact that in a small island on the German East African coast, where there are no mosquitoes, there is no malaria, believes that man is infected by inoculation. As the Texas fever in cattle is transferred from one herd to another solely by the agency of the tick, so, he supposes, is malaria propagated. The mosquito, he says, "receives the parasites, transmits them to its eggs and the young larvæ, and only the next generation is able again to infect with malaria parasites."

We have thus three mosquito theories which are at present engaging attention, each giving rise to researches that cannot fail to advance our knowledge of the subject. It is not my design to discuss the comparative merits of these hypotheses. My own attitude toward them is one of hopeful expectation. We may be quite sure that if one or other has in it a basis of truth, it will have to undergo important modifications in directions perhaps little antici-

pated, as research proceeds. I do not appear, therefore, as an advocatus diaboli to find fault. My object rather is to inquire how far the mosquito hypothesis in any of its forms, or in some possible modification, can be made to harmonize with certain well-established epidemilogical facts, which will find their explanation when the true solution of the problem has been attained.

The facts to which I shall briefly refer are the following: (1) Epidemics of malaria resulting from soil-disturbance; (2) the invasion of countries and districts previously free from the infection; (3) the extinction of malaria in countries where it formerly prevailed; (4) slow-spreading epidemics of malaria, in which, as the disease advances, it dies out in the region just visited; (5) local epidemics caused by the formation of artificial marshy foci; (6) ship-malaria; (7) the prevalence of malaria in northern latitudes at the season of the year when the temperature is under the freezing-point, and when insect life is in abeyance.

1. No fact in the history of malaria is better established than the frequent appearance of epidemics in connection with soil-disturbance. These may occur (a) in distinctly malarious countries in which the disease is endemic; (b) in regions where malaria had been previously little known; and (c) in localities where it had for generations been practically extinct.

The instances of a marked increase in the prevalence and intensity of fever following disturbances of the soil in malarious regions, such as Panama and other parts of Central America, Brazil, and Mauritius, will readily occur to the minds of all familiar with the subject. They could well enough be accounted for by assuming either that the mosquito-bred parasites present in the soil in a resting form have been "shaken out," as Manson puts it, and inhaled in the air, or swallowed in water; or, on Bignami's theory that a soil-parasite, set free by upturning the earth, has furnished an unusually large supply of virus to the inoculating insects to work with; but how are they to be explained on Koch's hypothesis?

No less numerous are the instances of very severe malarial outbreaks following soil-disturbance, in regions where malaria had been previously much in evidence. I shall quote a case in point, which I recently met with in Mackay's work on Formosa. "I spent," he says, "weeks with the savages in the mountains near Mount Silvia, and found them generally healthy. Pepohoan farmers moved into the neighborhood, and began to build huts, and to cultivate the land. Within one week the entire settlement was

prostrated with fever in its most intense form, and the sufferings of the poor savages were sad to see." A well-known instance of the same kind is that recorded by Wenzel, of the severe epidemic that broke out during the construction of the harbor in the Bay of Jahde on the North Sea. I mention it because there comes out in connection with it, as in many other epidemics of the same kind, a point which cannot at present be readily explained on Manson's hypothesis. It is this: "There is not only a corresponding increase in the average severity of the form of sickness as the summer advances, but also a preponderance of the shorter rhythms, and an approximation to the continued type; while with decreasing intensity in the colder months there is a corresponding lengthening of the rhythm to tertian and quartan." Upon the assumption that the infection is caused by the setting free of long-imprisoned insect-bred germs from the soil, it is difficult to explain why the parasites of the short-rhythm fevers should monopolize the hot season, and those of the tertian and quartan the cold season, respectively. They are "shaken out" of the soil, hypothetically, at the same time, yet the different parasites do not give rise to fever as they are brought to the surface, but each type appears in its regular season, just as in endemic and epidemic fever not arising from soil-disturbances.

Still more interesting, perhaps, are those outbreaks which have been observed to follow disturbance of the soil in connection with the making of railways, the digging of canals, the laying of gas-pipes, and so forth, in regions in which malaria has been as good as extinct for many generations. Trousseau mentions several recurring outbreaks of this kind in Paris during this century. "Even here in Paris," he says, "where intermittent fevers are of such rare occurrence that we hardly know them, they have shown themselves on similar occasions (that is, on the upturning of the soil). In 1811, during the digging of the Saint Martin canal, a veritable epidemy of intermittent fever prevailed in the districts of the Temple, the Villette, and Pantin. In 1840 there was a similar outbreak when the fortifications which now surround the capital were being raised. The diggings of later years required in opening up the town by new streets and boulevards, the construction of sewers and underground passages for gas-pipes, have caused numerous paludal affections; and more than one physician has been surprised by meeting with cases of pernicious fever which he was little accustomed to encounter in his practice."

In the same way ague was observed to increase to a marked extent in London, and hypertrophy of the spleen to become common in children, at the time when the Metropolitan railway was being constructed. In this kind of outbreak, too, just as in the others, all the types—quotidian, tertian, quartan—are represented; and the various grades—mild, severe, and pernicious—make their appearance, and follow their usual seasonal evolution. These soil-epidemies are difficult to explain on any theory—perhaps not more so on the hypotheses we are considering than on any other. I am not prepared to say that the mosquito or gnat-bred plasmodium may not preserve its vitality for many generations embedded in the soil. Of course, it has still to be proved that the plasmodium assumes a resting form. It is singular, however, to find all the forms indiscriminately "shaken out" of the soil develop one after the other in their ordinary seasonal sequence.

2. There are a few instances on record of the sudden appearance of malaria in countries where the disease was previously unknown. It will be enough to mention the disastrous outbreak in Mauritius in 1866-68, and in the island of Reunion, one hundred miles to the southwest of Mauritius, in 1869.

In Mauritius the infection spread slowly, de proche en proche, from one point to another, taking three years to complete the circuit of the island, thirty-seven miles long by thirty-five broad. In Reunion, on the other hand, it appeared at a remote and isolated point, having no communication with Mauritius, and spread with great rapidity, surmounting mountain chains nine thousand feet high, advancing against winds, and invading the whole littoral, whatsoever was the nature of the soil. I have been informed that a malaria-nursing mosquito was for the first time introduced into Mauritius in or about the year 1866. If this were satisfactorily established, it would afford very strong evidence indeed in favor of the mosquito theory. Some difficulties, perhaps not insurmountable ones, would, however, still remain. In Mauritius in 1866, and in Reunion in 1869, all the types and forms of fever appeared simultaneously. If the observations already alluded to, which indicate that each parasitic form requires a special host, are to be accepted, then not one but several plasmodium-nursing mosquitoes must have been introduced at the same time into Mauritius, and later again into Reunion, a rather unlikely coincidence. Upon Koch's theory, if it really assumes that any mosquito may serve as a host for the parasite. I see no reason why malaria should

not have been introduced into Mauritius at any time since its first colonization, for crowds of malarious patients were continually being introduced from Madagascar and elsewhere from the earliest period of its occupation. I shall just add that I have never seen or read of an epidemy of malaria in which all the types have not been present—a fact which, to my mind, supports Laveran's view of the unity of the parasite.

The island of Rodriguez, lying three hundred miles to the east of Mauritius, remains to the present day free from malaria. It would be interesting to know if any species of mosquito met with in the malarious districts of Mauritius and Reunion are absent from Rodriguez.

The instances of the sudden appearance of malaria in an isolated region in which it is not endemic, as a part of a general outbreak, are somewhat more numerous than these just referred to. They evidently present, in a somewhat different form, the same problem that meets us in Mauritius and Reunion.

Let me mention one instance in point, taking the well-known Professor Bergman of Upsala as my guide. Malarial fever is not endemic on the east coast of Sweden at any point north of Angerman river, in latitude 63 degrees. In the spring of 1846 malarial fever became epidemic at the endemic foci of the disease on the east coast, not, however, in the district of Nykoping, an intense endemic centre, and quite close to the localities suffering from the epidemy. It also prevailed on the shores of the Malar lake, and at some points on the Venar lake. But the remarkable fact to which I wish to direct attention is its appearance, also in the spring of 1846, in Lulea—a marshy district at the head of the Gulf of Bothnia, close on the 66th parallel. We can hardly suppose that a plasmodium-nursing gnat or mosquito had been introduced in the spring of that year into a place bordering on the Arctic Circle, for the temperature at that season, in that region, is much below the freezing-point and incompatible with the existence of the developed insect. It is remarkable, too, that it should have appeared there coincidently with its outbreak in the south, while the intermediate coast line, and even noted malarious localities in the immediate neighborhood of the epidemic centres, were spared. I do not know what type or types were met with in this remote, isolated region; but it is evident that if all the types were represented, as was the case elsewhere during this outbreak, the difficulty would be materially increased.

The difficulty as to its appearance in spring may possibly be removed by considerations which will be noticed as we proceed.

3. The decline or complete extinction of malaria in countries where it formerly prevailed is an epidemiological fact of great importance in its bearing on this and kindred theories of the infection.

Malaria is now practically extinct in many parts of England and Scotland, where it prevailed in the last century, and even in the early years of this century, and its disappearance has evidently followed on the drainage and cultivation of the soil. Has the drainage of marshy land led to the disappearance of some species of gnat or other suctorial insect from these localities? There are still, fortunately for science, some malarious districts in England, and it would be of extreme interest to ascertain whether any species of gnat are present in these which are absent from non-malarious localities. Surely our entomologists should be able to answer this question. It is said that there are nine species of gnat in Great Britain. Are any of these peculiar to malarious districts? If so, it would be desirable to repeat Ross' experiments, by feeding them with malarial blood, and observing if any pigmented bodies, such as he describes, are developed in them.

4. There are several instances on record of malaria fever spreading slowly over regions previously healthy, and disappearing in the districts recently invaded as it steadily advances onward in a given direction. These may be called marching epidemics. They are like the onward march of an army, which, as it pushes forward, leaves the country previously occupied free from its presence. The disease in these cases does not last longer than two or three years in one locality.

Such was the nature of the epidemy that spread over a great part of New England in the end of the sixties and in the seventies. The fever was not restricted to marshy localities, for high lands, free from pools and standing water, were attacked apparently as often and as severely as humid and marshy places. All the fever-types were represented, and the worst congestive forms were prevalent during the height of the epidemy. Here there could be no question of water-supply or of soil-disturbance. Perhaps, if we knew more of the habits of the insects supposed to breed or inoculate the parasite, this kind of outbreak, at present so mysterious, might find an explanation.

5. We have also examples of quite local and temporary out-

breaks, clearly dependent on the establishment of marshy f some locality where malaria is little in evidence or altogeth sent. Malarial fever broke out in Bound Brook, in New Jers 1881, from the temporary formation of an artificial marsh of or seventy acres. The inhabitants, numbering from a thous thirteen hundred, who had previously been quite free from were all, without exception, attacked with intermittent and tent fevers and neuralgias. When the obstruction which c the marsh was removed, and the land converted into meado fever immediately disappeared.

Belonging to the same category are house-epidemics. stance of this kind is recorded by Friedel and quoted by I as occurring in the Marine Hospital at Swinemunde, near S A large day-ward for convalescents was evidently malariou after a patient had occupied it for several days he was sure seized with tertian fever of a severe kind. In no other wa this occur. On examination, a large rain-reservoir filled rotten leaves was found to have overflowed and to have for marsh four to six square feet close to the doors and windo the room, which, on account of the hot weather, were kept at night.

If the plasmodium is a normal parasite of insects which l marshy localities, the creation of a marsh may be supposed t to the immigration into such locality of an insect previously from it. Up to a certain point, therefore, these local epidemi explicable on this hypothesis; but the sudden appearance c or more plasmodium-nursing insects in localities from whicl were previously absent, and the rapid infection of an entire munity, present difficulties not to be ignored.

I have no satisfactory explanation to offer of house-epid such as that related. On Bignami's inoculation theory, it wo difficult to account for the infection being restricted to a room, for, however limited may be the range of these cre they would not likely have failed to effect an entrance in other wards.

6. Ship-malaria. Malarial fever, or at least a fever pres all the clinical features of that disease, has been observed to out on board ship, on the ocean, in circumstances which abs preclude the possibility of the infection having been contrac shore. Assuming that these fevers are really caused by the atozoon of malaria, they appear to me to be absolutely ir

cilable with Bignami's inoculation theory, for gnats and mosquitoes are not met with at sea. It may be held that a mosquito-bred plasmodium was present in the ballast or cargo, and in some of the instances the possibility of this must be admitted. A case in which the fever seems to have been caused in this way is related by Simon. In March, 1887, while the French ship of war La Vipere was stationed in the Bay of Halong, six out of a complement of seventy-seven men were seized with malarial fever. None of them had been on land for a long time; the bay was not marshy, and the temperature at the time ranged from 12 to 15 degrees C. Simon concludes from this that the infection was not contracted on land, but developed on board. In the lowest hold there was a quantity of slimy sand which had been taken in as ballast, and which, being near the engine, was kept at a high temperature. This hold had been occupied as a sleeping-berth by the six malaria-stricken patients. Simon was of opinion that the germ of malaria was in the sand and had become diffused in the air of the hold. The disease ceased as soon as the hold was cleaned out and disinfected. But how are we to explain the cases in which the infection was apparently caused by the air of a moldy store-room, as in Holden's well-known case, or those in which it has developed during a voyage from a non-malarious country, from the planking of a vessel having become wet during stormy weather, which prevented ventilation? Perhaps it would be wiser to wait until the malarial character of house and ship outbreaks has been demonstrated by microscopical examination of the blood before speculating.

The season of maximum malaria prevalence in temperate climates is not summer and autumn, but spring, when the temperature in northern latitudes is under freezing-point.

The disease often develops in a severe epidemic form in very cold weather. Frank tells us that he witnessed intermittent fever to reign in Vilna in the month of February, when the thermometer marked 13 degrees below the zero of Fahrenheit. Walther says that in Kieff and the eastern governments of Russia, epidemics of malarial fever show themselves when the whole country is under a firm covering of ice, and in these circumstances attain a higher intensity than in the hot summer time. These facts have been rather ignored in speculation about malaria, yet they must fit in with any true theory of the disease.

It is generally held that the absence of malaria from high lati-

tudes and altitudes is owing to their low temperature. Hirsch fixes the summer isotherm of 59 or 60 degrees F. as the limit of malaria in Europe, and concludes that regions in which the mean temperature of the warmest months is under 59 degrees F. are exempt from fever, as this summer-autumn temperature is necessary for the evolution of the infection. He does not, however, explain in what way the temperature of summer and winter can affect the evolution of a disease which in these latitudes is not a summer and autumn one, but essentially a spring disease. In Sweden the fewest cases of malaria occur in July and August, which are the hottest months, and the next fewest in December and January, which are the coldest months. In Leipzig, malaria is essentially vernal. Here there is no autumn rise. It Dittmarschen, in Holstein, where the country is marshy and where malaria is intense, we have two marked outbursts, one in spring, the other in autumn, the maximum prevalence falling on autumn.

The question whether the spring and autumn fevers, in countries such as Sweden and Holstein, are caused by the same parasites, cannot be looked upon as definitely settled. Mannaberg, however, says that he has never met with crescents in Vienna, where the disease is mainly vernal, but where a very distinct autumn outburst, somewhat more marked than in Sweden, is also observed. This points to the conclusion that the spring and autumn fevers alike belong to the simple or large parasite forms—not to the malignant or small parasite crescent-forming varieties. There is no reason, then, for supposing that there may not be some genetic relation between the autumn and spring broods of fevers. What is that relation?

If the summer and autumn temperature be really the factor which determines the latitudinal limit of malaria, then we are forced to the conclusion that the germ grown—whether in soil or in mosquito—in summer and autumn must give rise to the crop of fevers appearing in the succeeding spring. If the spring infection is not caused by an autumn-grown germ, then, I maintain, the temperature of summer and autumn has nothing to do with the limits of malaria, or with the presence or absence of malaria in these countries. The appearance of malarial fever so early as February in northern latitudes is clearly irreconcilable with the view that the infection is inoculated in spring by gnats or mosquitoes, for I presume that these insects are absent at that season from these ice-bound regions. Nor can we suppose that any plasmodia

are bred at that season. Assuming, then, that the spring crop of fevers in these latitudes is the harvest, so to speak, of seed grown in the soil, in the mosquito, or some other insect, during the preceding summer and autumn, how are we to account for them breaking out in spring? Two explanations suggest themselves: (a) We may suppose that the spring febricants contract the infection through the air, by food or water, or by inoculation during the summer and autumn, and that it remains latent in the system during the winter, to break out in the spring. The germ may in this case be supposed to be introduced into the body in a stage of development at which it cannot produce fever; that it has to undergo development or metamorphosis in the spleen, the medulla of the bones, or other internal organs, for a time corresponding with the period of latency. The infection contracted during the early part of summer would manifest itself as a febrile disease in February, that contracted in autumn later. (b) We may, on the other hand, suppose that the germ produced in summer and autumn has to undergo some development outside man, in the soil or in some other animal, before it becomes infectious to man; and that it is only in spring, after it has undergone the necessary changes outside man, that it effects an entrance into the human body and gives rise to fever. Whichsoever of these two views may ultimately prove correct, I have no doubt that the spring fevers are the brood of summer and autumn germs.

Looking now at the whole question as it presents itself to my mind, in the light of Ross' observations and the analogy of parasitism, I shall state my views in a few sentences.

The malaria parasite is not dependent on man for its existence. It meets him, to his sorrow, in regions previously uninhabited. This fact in its history is adequately accounted for, on the supposition that the plasmodium lives and multiplies in the soil of malarious localities, and finds its way into the system in water or air, or, as Bignami suggests, by inoculation, the virus being conveyed from the soil in which it is present by the agency of mosquitoes or other insects. But on this theory, which implies that man is merely an accidental host of the plasmodium, it is difficult to explain how a soil-parasite should adapt itself so perfectly to life in man, should develop and multiply in the system, and become latent there until conditions favor its renewed activity. This perfect adaptation to its human host is not what one would expect in a parasite whose normal life-cycle is in the soil. The forms of

the parasite which come into existence after the blood is r
from the body, and which seem to have to do with the
corporeal life of the plasmodium, have no meaning on t
pothesis.

The theory that the parasite is removed from man by t
quito, in which it undergoes development, and in the secor
eration is able again to infect man by inoculation, affords
planation of how it exists and maintains itself where mar
sent, how disturbance of the soil gives rise to epidemics,
the disease is absent from countries where mosquitoes abou

We have no difficulty in accounting for the presence of
in uninhabited regions, on Manson's hypothesis, that the
dium is a normal parasite of the mosquito. This mosqui
plasmodium is hypothetically there to infect him as soon a
trudes into a malarious region. But this theory is not witl
difficulties. If we assume that any mosquito or gnat is cap
serving as a host of the parasite, then the introduction of
malarious patient into a healthy country would give ris
epidemy of fever, which is not the case. If each form of
has its own appropriate host, as Ross on grounds of exp
affirms, this difficulty is got over; for unless the suitable m
is at hand, the presence of a malarious patient will not s
start an outbreak. But a difficulty of the kind we have me
in connection with the soil-hypothesis meets us; for if the
completes its life-history in the mosquito alone, and can n
itself in this insect without requiring the aid or interver
man or any other animal, how are we to account for its
adaptation to life in its human host, or for the fact that ir
runs a different cycle from what it does in the mosquito;
words, that its cycle in that insect is apparently comple
to that which it runs in man? Man is clearly not an alt
host of the parasite, in the sense that it can run in him t
cycle as it does in the mosquito, and can thus take the pla
speak, of the mosquito in relation to the parasite. F
glimpses we get of it in the mosquito's stomach, after it h
removed from man (assuming always, as is highly probal
the growing pigmented bodies described by Ross are mala
modia), we feel assured that the life-cycle of the parasi
insect host is altogether different from that in man. Ma
alternative host only in the sense that the parasite runs one
its cycle in him, the other and complementary part in t

quito. Why, again, we may ask, should the plasmodium gratuitously attack man, if its existence is assured by the mosquito alone, and why should provision be made for its removal from the blood of man if this removal is not necessary for its propagation? May we not rather conclude that man and the mosquito are both necessary for its propagation, its cycle being from man to mosquito and from mosquito to man in never-failing series? And this is what appears to be the case in respect to the closely allied proteosoma of the sparrow. It runs a double cycle—from sparrow to mosquito and from mosquito to sparrow. There is no evidence that it can complete its life-history in the mosquito alone. Are we not therefore justified, on the ground of analogy, in assuming that the malaria parasite also requires two hosts for its continued existence?

But if we assume that man alone serves as the host in which the first part of its cycle can be run, the presence of the parasite in malarious countries before the advent of man is inexplicable. As the proteosoma can run the first part of its course in the crow and lark, as well as in the sparrow, may we not suspect that man is not the sole alternative host of the parasite vis-a-vis to the mosquito, but that other animals present in malarious countries may, in the absence of man, and even when he is present, serve as the host of the parasite, in which it runs the first part of its life-cycle, and from which it is removed by the agency of the mosquito, in order to complete its cycle in that insect? It may be quite true that any mosquito cannot serve as a nurse for every form of the parasite, but the fact that the tertian parasite, as we know it in Europe, exists in India, where it is propagated by a barred-backed mosquito which does not exist in northern Europe, points to the conclusion that not only may some of the lower animals fulfil the role of man, but other species of insect may take the place of the dapple-winged and barred-backed mosquitoes as hosts of the parasites.

I do not think of the disease in regions uninhabited by man as passing from mosquito to larva and from larva to mosquito in never-failing series, but as passing from the mosquito directly by inoculation, or indirectly through soil, water, or air, to some animal in which the parasite runs a cycle analogous to that observed in man, and from these, again, to the mosquito or other insect feeding on the blood of these malariated animals, and so on in never-failing series.

It may be urged against this view that it is contrary to the re-

sults of inoculation experiments, and unsupported by observations of the occurrence of malarial fever in the lower animals. Too much importance is not to be attached to the negative results which have followed the injection of malarial blood into the lower animals, as a proof that the parasite cannot develop in them. It does not follow that animals are immune to the infection because it cannot be communicated to them by inoculation with human blood. Besides, it is quite possible that the alternative host has not yet been found and experimented upon. It is not even certain that the disease in the lower animal, which hypothetically serves as the host of the parasite, is a febrile one. Malaria is not necessarily febrile in man. Apyrexial forms are known.

There is evidence of a kind not to be ignored that some of the lower animals do suffer from febrile forms of malaria in all respects similar to, and probably indentical with, the human disease. Parke, in his work entitled "Personal Experiences of Equatorial Africa," assures us that the donkeys belonging to the expedition suffered from intermittent fever. Their hair stood on end, their ears dropped, and, as he says, "They looked miserable all over." Their temperature was high; in one case it reached 106 degrees F. in the rectum. The fits were brought on, too, in the same way as those in man. Swimming across a stream always brought on an attack in them, "just as it did in the case of their Christian and pagan fellow-travelers." Lawes, in New Guinea, observed dogs to have shivering fits, followed by a hot stage. These fits lasted for a few hours and returned at regular intervals. Macculloch, long ago, recorded similar observations of malarial fever occurring in dogs in Britain, and many authors assert that they have witnessed tertian fever in horses, cows, swine, and other animals. In none of these cases, of course, has the blood been examined for the malaria parasite; but these facts nevertheless render it by no means improbable that more than one species of the lower animals suffer from human malaria. We shall thus have to look for some animal present in malarious regions that normally performs the role in which man participates when he appears on the scene, and for other insects that can take the place of the dapple-winged and barred-backed mosquitoes.

Should this view, that the malaria parasite runs a double cycle, and that other animals may take the place of man as its host, prove correct, as I think it will, some of the difficulties which at present surround the etiology and epidemiology of malaria would be lessened or disappear.

Postscriptum.—The day after this paper was read, Dr. Manson communicated to the British Medical Association some important observations of Surgeon-Major Ross on the development of the proteosoma of the sparrow in the mosquito which appear to prove that this parasite runs a part of its cycle in the sparrow, the other, or complementary part, is the mosquito. This supports the view that malaria runs only a part of its cycle in the mosquito, and that it must find an alternative host in some other animal in malarious regions from which man is absent. This should encourage observers in malarious regions to seek for the host in which the parasite normally runs what we may call the first part of its cycle. The diffusion of malaria will probably be found to depend largely on the presence of this alternative host.—Edinburgh Medical Journal.

THE PLAGUE IN INDIA.—The London Spectator of December 31 says: "The plague appears really to have made some impression on Hindoo minds. A great meeting was held in Bombay on December 28, at which some five thousand 'Bohras' were present with their high-priest, together with Professor Haffkine, who has discovered a very promising form of inoculation. The high-priest made a speech, in which he declared that there was nothing opposed to religion in the professor's system and then and there consented to be inoculated, and, what was a stronger indication of his faith, to suffer his son to be inoculated also. A large portion of those present followed his example. There it is. The Hindoos will not endure segregation, which involves the removal of women from their homes, nor will they bear domiciliary visits by soldiers, but if the white doctors can suggest remedies or preventives which do not menace their honor, they will follow them readily enough. The point is to convince their own ecclesiastical leaders first of all that no oppression is intended. It is natural enough that doctors and magistrates who know that they intend only to benefit the people should be impatient of a foolish resistance, but a little more persuasion and coaxing done through the right agents would smooth the path of science very greatly. To the cleansing of the drains, to the slaughter of the rats, to the burning of infected houses—with compensation—there is no resistance whatever."

TYPHOID FEVER AT ARMY CAMPS.

Washington, D. C., May 3, 1899.—The session of the As tion of American Physicians, at the Arlington to-day, was m by an important paper on typhoid in the volunteer camps l V. C. Vaughn, one of the Board of Surgeons appointed by S Gen. Sternberg last summer to look into this matter whe epidemic was prevalent in the various army camps. The B report is not yet completed, but Dr. Vaughn's paper was i nature of an advance statement, with the sanction of Gen. S berg, who was present at the meeting.

The paper was a severe arraignment of the volunteer sur and incidentally of the officers who were responsible for the ing of the great camps at Jacksonville, Chickamauga, Camp and Montauk Point.

The Board found that the prevalence of typhoid could r laid to impure water in any large degree. The explanatio Vaughn said, was in the disgustingly filthy condition of the c

Dr. George Dock of the University of Michigan spoke investigations at the Sternberg General Hospital. The grea of supposed malaria cases, he said, were not malarial infecti all, but many of the doctors, regardless of this, dosed their pa with from 30 to 40 grains of quinine each day.

The Philadelphia Ledger of May 1, in summing up the ject, refers to a published statement of Surgeon-General Ster bearing on the typhoid fever epidemic in the camp of the E United States Cavalry at Puerto Principe, which was brou its attention by Dr. M. S. French. It was a letter received b French, written by one whom he held to be competent to of the conditions of the camp, and published in the Ledger first attracted public attention to the deplorable condition a the troops. In view of the part played by Dr. French in the of relief for soldiers during the war his statements as to th ditions at Puerto Principe as to the Surgeon-General's pub interview regarding them have especial interest.

Dr. French believes that in the light of the knowledge past summer there should never have been such an expe with typhoid fever among the troops in the field as that at P Principe. "During the past summer," he said, "it was my p as well as of the National Relief Commission, to refrain from

ment and criticism, and it was for this reason that I declined to go before the Investigating Board when summoned, but when knowledge of the existence of such a state of affairs as prevails among the men at Puerto Principe comes to my attention it leads me to infer that comment and criticism, even at this late day, may remedy what we hoped had been remedied long ago.

"In the light of medical knowledge as it is to-day," continued Dr. French, "typhoid fever is the one disease that should not exist. With knowledge on the part of those in authority and ample resource in the way of means, the existence of such an epidemic of typhoid fever in a military camp is inexcusable. It was just as inexcusable throughout the whole campaign with Spain as it is to-day. The Surgeon-General brands typhoid fever as a 'filth disease,' which is exactly what it is. The existence of the disease in an epidemic form is due to ignorance, indifference or carelessness on the part of those in charge of the sanitary condition of a camp. Typhoid fever is the same to-day that it has been in the past. Its character has not changed. Its cause is the same. But our knowledge of everything relating to it has vastly improved. However, nothing new has been learned between this date and the opening of the war with Spain. Up to this time such information as has been obtained by the Typhoid Fever Board is not at all new or unexpected.

"The Medical Department of the United States Army had sufficient experience at Camps Miami, Jacksonville, Chickamauga and Meade. The fact that there was so little typhoid fever at Camp Mackenzie is explained by the fact that no sick soldiers were taken there, no previously worn clothing of sick men, no infected materials of any kind. Pure water was obtained, and the most modern sanitary plumbing appliances were used.

"Had the knowledge obtained through the experience of the past summer been honestly utilized by the Medical Department, with the assistance of the other departments of war, there would have been no reason why typhoid should have again appeared as an epidemic in any United States Army camp, and there is no man more fully aware of this than is the Surgeon-General himself, as the entire medical profession is aware of his skill as a microscopist and bacteriologist. Hundreds of graves that have been made since the declaration of war with Spain are silent witnesses to the existence in the camps of a destroyer that medical science had greatly controlled. The lessons of the past should be

remembered by those high in authority, and the lives of the t
will be protected if the teachings of these lessons are acted
The soldier must have good water, favorable sanitary surr
ings and good food. This will enable him to resist disease.

"It is stated that an investigation has been ordered to asc
the causes of the outbreak. There is no need of an investig
for the causes are well known. Efforts should be direct
remedying the existing condition, rather than to endeavori
ascertain the cause. Had precautionary measures been
when the camp was pitched and the men assigned to it,
never would have been such an outbreak. The responsi
belongs to the higher medical officers in charge. If they
competent men and had done their duty, there would have
no epidemic.

"The Surgeon-General says that he had been aware of the
dition two weeks before any informant wrote. However
may be, observations made by me at Montauk Point last sur
fully convinced me that affairs at Camp Wyckoff were sli
different from what was supposed in Washington, and I so
the Surgeon-General at the time. It would be interesting to
the exact date of the receipt of the information by the Surg
General and the exact time at which the needed supplies
sent to the infected camp."

Dr. French called attention to that part of the published i
view in which it was stated that the Surgeon-General "po
out that the Medical Department could not load vessels nor
antee shipments by steamer at any given date, and that the du
the office was performed when it met the requirements of
for physicians, hospital and medical supplies and turned
over to the Transportation Department of the Army for shipr

"Such a condition as may be inferred from this," said
French, "existed, it was claimed, during the past summer
should not have existed then, but certainly ought not to
now. The less said by the Department in Washington as t
transportation service last summer the better. The conditic
it might have been excusable under the circumstances, but
inexcusable at present. To-day the Government has all the m
it needs to care for the troops, and all the time; there is no Sp
war in progress and no condition exists that should hampe
Quartermaster service. However, this is the day of explanat
as some excuse must be made to the public for the needless
alence of preventable sickness and consequent loss of life."

SANITARY AUTHORITY.

AN INTERESTING LETTER AND AN IMPORTANT DECISION.

The Secretary of the State Board of Health a few days since received the following communication, which was referred to the Attorney-General for an official opinion, inasmuch as letters of similar import had been previously received:

"*To the State Board of Health:*

"A few days ago I received a notice from one of our citizens to look after Mr. ——— and clean him up. I went there the next day and found the man, whose wife had left him fifteen years ago, in a shanty only ten by sixteen feet, the walls consisting of one thickness of lumber, smoked black; the floor covered with wood, cobs, chips and dirt beyond description; old, half-broken crockery partly filled with night soil; bed consisting of two feather beds that had not been washed for fifteen years, with no sheets and no slips.

"He never washes his body and eats nothing but bread, though lately he has added crackers, ginger snaps and syrup. He has been sick for quite a while and sent for a doctor lately, who pronounced the disease scurvy (Scorbutis), and says he can't cure him in such dirt and with such diet.

"The man owns a farm of one hundred and sixty acres, and several houses in town, and surely has money, but is a miser. His neighbors have before now fed him when he was sick, but he would never pay for anything. I went to the county seat and tried to persuade the authorities that he was insane, but they said that as long as he could manage his business he was not.

"Now I would like to know if the Board of Health of the township can clean him up against his wish. And what good would this do if we did not buy him new clothing and a new bed and move him into one of his tenant houses which will be unoccupied in a few days?

"Now can we buy these things and collect the money from his property the same as tax? I have known this man for a long time, and heard that he lived dirty, but I never saw a human being in such a condition. I would like if you could send instructions in this case. Can we declare a private house a nuisance?

"Yours, ————."

DES MOINES, Iowa, March 30, 189

Dr. J. F. Kennedy, Secretary State Board of Health, Des Mo
Iowa:

DEAR SIR—Your favor of the 27th inst. at hand, enclosir letter, in which you ask my opinion as to what rights the l Board of Health has under the facts stated in the letter. The f stated are brifly these:

A man is living alone in a shanty, surrounded by filth an the midst of filth, and has been so living many years until h infected with the scurvy, and he himself and the dwelling h become the source of disease and a menace to the commu He owns a farm of one hundred and sixty acres, several ho in town, and has money and other property, but is a mise instinct and practice. The question is whether he can be cle up, new clothing purchased for him, his house cleansed, or h taken to another house which he owns, and cared for during sickness, and whether the expense of thus caring for him ca collected from his estate.

The local Board of Health has full power, under section thousand five hundred and sixty-eight of the code, "when s fied upon an examination that any cellar, room, tenement, b ing or place occupied as a dwelling or otherwise, has becom is, by reason of the number of occupants, uncleanliness or c cause, unfit for such purpose, or a cause of nuisance or sick to the occupants or the public, to issue out a notice in writin such occupants or any of them, requiring the premises to be in proper condition as to cleanliness, or require the occupan remove or quit such premises within a reasonable time to be f and if the persons so notified, or any of them, neglect or r to comply therewith, they may, by order, cause the premises properly cleaned at the expense of the owner or owners, or forcibly remove the occupants and close the premises, and and police officers shall execute such orders, which premis closed shall not be again occupied as a dwelling place withou written permission of the Board."

Section two thousand five hundred and seventy-three provi manner in which the general purposes stated above may be ried out, and also provides that the removal and cleansing m done at the expense of the owner or occupant.

Section two thousand five hundred and seventy-three provi

penalty for failing to comply with the orders and regulations of the Board of Health. The costs of the abatement of the nuisance under the provisions of section two thousand five hundred and sixty-nine may be taxed up as costs in the proceedings before the justice, and be collected like any other judgment by execution. The forfeiture provided in section two thousand five hundred and seventy-three can be recovered in an action in the name of the Clerk of the Board.

The provisions of law are ample to meet such a case, and if the facts are stated correctly in the letter which you enclosed, the local Board of Health should not hesitate to enforce the law with firmness, remove, or cause the old man to be removed, from the filth and squalor in which he dwells, clean up the house, or fasten it up so that it shall not be occupied again as a dwelling, and if its present condition is a menace to public health in case it were nailed up, destroy it, and take such steps as may be necessary to remove the evil and source of disease from the community.

No man has a right to use his home so as to injure others, or to be a menace in the community, and no false ideas or sentimentalities about the personal right of a man to do as he pleases with his own, should prevent the Board of Health from taking heroic action, if necessary, to protect the public and to protect the man against himself. Yours respectfully,

Iowa State Board Bulletin, April, 1899. MILTON REMLEY, *Attorney-General.*

NON-COMMITTAL.—A calm, blue-eyed, self-composed and self-possessed young lady, in a village "down east," received a long call the other day from a prying old spinster, who, after prolonging her stay beyond even her own conception of the young lady's endurance, came to the main question which brought her thither: "I've been asked a good many times if you were engaged to Dr. C——. Now, if folks inquire again whether you be or not, what shall I tell them I think?" "Tell them," answered the young lady, fixing her calm blue eyes in unblushing steadiness upon the inquisitive features of her interrogator, "tell them that you think you don't know and you're sure it's none of your business."

HAVANA'S GOOD HEALTH.

Washington, D. C., May 1.—The general state of hea Havana is better at this time than it has been since the r of sanitary conditions were begun in that city by the U States Hospital Service in 1897. At a season when yellow is expected to be especially prevalent in the Cuban capit disease which is attracting most attention is measles, from one death has recently occurred. Some diphtheria also pr but in this case antitoxin has been used by the medical c with great success. Only one death from yellow fever h curred within the last month, the victim being an English master, whose vessel was lying at a wharf at Cacahanca. tary Inspector Brunner, in a report to the Supervising Su General of the Marine Hospital Service, says:

"The absence of the yellow fever I cannot understand. the United States troops quartered in this city, and with th number of Americans who still remain, and nearly all of are non-immune, it was to be expected that more cases of from the disease would result by this time.

"The sanitary conditions have improved and no one ca fault with the methods employed generally, but at the sam no one who knows the situation should expect that any perr sanitary work could be performed in less than three months. could any one hope that the said work could have any ef reducing the death rate or could have any appreciable ef checking the spread of yellow fever."

The rigid character of the sanitary regulations governi arrival and departure of vessels at Havana is thus descril Sanitary Inspector Brunner:

"The work of disinfecting vessels bound for ports in the States began on April 3, and up to the 20th instant twenty had been disinfected. These vessels were bound for differen in the Gulf and on the South Atlantic coast. One vessel, a s from Charleston, S. C., came here with a general cargo fro city, and by special request of Dr. Horlbeck, Health Officer City of Charleston, she was disinfected in order that she proceed to Central American ports for a cargo of fruit an return to her original port of departure. By disinfection h vessel was the pioneer of a trade made possible between sc ports and Havana, and I look on this new departure as the g

help to southern commerce ever extended by the National Government, and a help which is beyond the reach of municipal or State Boards of Health. I cannot see why southern ports should not enjoy now many advantages heretofore not available to them."

THE NEW DISINFECTING PLANT.

Havana, April 29.—Much interest is being taken in the new disinfecting plant now under construction by Col. Black of Gen. Ludlow's corps of engineers. Mr. Woolf, the inventor of a system for making sea water a germicide by means of electricity, is here superintending the work. He has a contract with the city to sprinkle the streets with 50,000 gallons of water daily, and it is hoped in this way to help to control the yellow fever. The water will also be used by the sanitary authorities for disinfecting the houses of fever victims. The plant will be in operation in fifteen or twenty days.

CIRCULAR No. 12, dated Havana, February 20, 1899, embodies the recommendations of a Board of Medical Officers convened for the purpose of devising "some uniform system of disinfection of grounds, buildings and appurtenances of all buildings and sites formerly occupied by Spanish troops before their being assigned to United States troops for habitation."

The recommendations of this Board were that walls and ceilings, when painted, should be washed with bichloride solution and repainted; when kalsomined, to be washed thoroughly with milk of lime and rekalsomined. Window-frames, doors and other woodwork are to be carefully examined and any rotten material removed and burned. The sound parts are to be scrubbed with lye and hot water, washed with bichloride solution and repainted. All floors are to be taken up, including joists on lower story, and replaced by tiles or tongued and grooved lumber, all decayed wood to be removed and all joists to be washed with milk of lime and repainted.

If on the ground the earth should be removed for a depth of about twelve inches and the space filled with concrete and paved with tiles, cement or asphalt. The new floor is to be above the ground level. Tile or cement floors, if in good condition, are to be thoroughly scrubbed with soap, lye and hot water and washed with bichloride solution. Earth floors are to be excavated one foot, filled with concrete, and paved with tiles, cement or asphalt.

Additional doors and windows are to be cut wherever necessary.

Cesspools, if external, and their use be necessary, are to be emptied with the odorless excavator, thoroughly cleaned, have their walls cemented and be thoroughly sprayed with milk of lime. Such as are to be abandoned, if full, are to be emptied, filled with earth and paved over with cement or asphalt. If the contents are more than four feet from the surface and are sufficiently solid, they may remain, provided they are covered with a layer of lime six inches in depth, filled with dry earth and paved with cement and asphalt. Internal cesspools are to be emptied, sprayed with milk of lime, filled and sealed in the above manner.

All weeds, high grass, dead vegetation, thick shrubbery or banana plants are to be removed and burned. All marshy spots are to be thoroughly drained and the surface of the ground thoroughly policed. No flower or vegetable beds are to be permitted near the barracks. All wooden outhouses, palm huts, etc., are to be burned. Cisterns are to be pumped out, cleaned by scrubbing and cemented where necessary. All articles of furniture are to be destroyed or submitted to steam disinfection. It was recommended by the chief surgeon, in an endorsement in this report, that no building be occupied by troops until the above plan of disinfection had been thoroughly carried out.

TEST FOR THE PRESENCE OF NICOTINE IN TOBACCO.—To demonstrate the presence of nicotine in tobacco smoke, Kissling uses a bottle half full of water rendered faintly acid with sulphuric acid: two tubes pass through the stopper, one dipping into the fluid and having a cigar inserted in the upper end; through the other much shorter tube the assistant draws the smoke in the ordinary way of smoking. When a portion of the cigar is consumed, a few drops of Mayer's reagent are added to the liquid, in which a copious precipitate is produced in the presence of nicotine. Further evidence of nicotine may be obtained by rendering the solution alkaline with soda and distilling. The idea that a picoline base, and not nicotine, causes the reaction described is not borne out by this experiment. Previous investigations by the author also show that tobacco smoke contains relatively a large proportion of nicotine and never more than a very small proportion of picoline base.—Chem. Zeitung, lxxviii., 805.

CANADIAN LEPERS.

The annual blue book (St. John Telegraph, April 19), issued by the Department of Agriculture, deals with the lazaretto at Tracadie, where a number of lepers are confined. Of them, Dr. A. C. Smith, the inspector and physician, writes as follows:

"Including the three Icelandic patients there are to-day 21 inmates of the lazaretto, 15 males and 6 females, representing all stages of leprosy. Classifying them for convenience we may represent the number in the first stage to be 5, in the second 11, and in the third, or final, stage 5. The ages vary from 11 to 62 years.

"During the year there were two deaths, and three new cases were admitted. The general health of the inmates is at present good. Medical aid consists in treating symptoms, meeting emergencies, prolonging life and making it more bearable. In cases outside the province supposed to have been associated with syphilis I found iodide of potash very useful in determining and separating the complications. I received a consignment of Carrasquilla's anti-leprous serum, and made use of it in the hospital, but with negative results.

"Under the ordinary precautions our lepers are free to receive the visits of friends and ministers of religion, and are attended by a chaplain. When admitted to the institution our lepers were, with one or two exceptions, unable to read. They have no employment, and pass the time in indoor games, and outdoor walks in suitable weather. They are seemingly happy; but, among the men, the unoccupied intellect, at times, finds an inclination to give annoyance which even the gentle influence of the religious ladies in charge can hardly prevent. The lazaretto is an asylum, based on the highest humanitarian plane. Comfort, and all that can conduce to the amelioration of the unfortunate inmates is considered, even the secular education of the younger patients being attended to.

"Since the establishment of a lazaretto in 1844, leprosy has been more or less kept in check in this province; and during the past few years a more careful segregation has led to a notable diminu-

THE NEW PUBLIC LIB

tion. I am fully convinced that when those afflicted with ease are not early removed to the hospital, but remain unsegregated, other members of the family become When, on the other hand, patients are removed early, or isolated, there is no spread of the malady. The chief i in causing the decrease of leprosy would appear to be clusive dealing with the individual leper as himself the s ill to others. Our experience in this matter agrees with others in foreign countries. It may be of interest to adc the case of a patient brought by me from another provi year, there was exemplified the occasional long period of tion of leprosy, nearly 30 years having elapsed since this had been exposed to the contagion of the disease. Du year, as in former times, I have been called on to examine falsely, sometimes maliciously, reported leprous, and to necessary certificates. Vaccination for smallpox is now by many to be a patent agency in the diffusion of lepr Mexico, and in the Sandwich Islands, after a general vac numerous leper centres developed in various parts where ease had previously been unknown. As very few, if any residents in leprous districts have yet been vaccinated, this is worthy of consideration.

"Another matter to which I am directing attention is posal of our leprous dead, now being buried in the centr village. Bacteriologists have shown that the bacilli of unlike many others, resist putrefaction—at present it is no how long. I believe that the soil is dangerously poisc many years by the bacilli of anthrax.

"The probable emigration from, as well as increased i tion to the newly acquired Hawaiian territory with it leper colonies is causing uneasiness in the United Sta measures are already being taken to prevent the introdu leprosy into California. The conditions do not exist to permit the general spread of the disease in Canada, but w not neglect every safeguard against it, for it is an insidi ease, and may gain a foothold in communities without a attention. The great majority of physicians are strange disease and would mistake it for something else, but the qu officers of the different stations will have qualified them detect even suspicious symptoms. Leprosy in Cape Br quires no special attention from the Department; I hol under control."

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FINANCIAL VALUE OF SANITARY IMPROVEMENTS.

In his second inaugural address, April 10, the recently re-elected Mayor of Chicago took occasion to point out the financial results. based on the money value of human life, which will accrue from the expenditure of a couple of million dollars in the construction of an intercepting-sewer system, by which all sewage will be diverted from Lake Michigan, the city's water supply, into the sanitary waterway of the drainage district. The first section of this work was completed last summer, at a cost of less than $200,000, and consists of the diversion of two main sewers from the lake into the south branch of the river. These drain a thickly-settled area of about 150,000 population, and, until the diversion was made, their foul drainage was emptied directly into the lake, affecting the sanitary quality of the water of the four-mile tunnel, which, from the distance of its intake from shore, should be the purest.

At the end of February last the Health Department tabulated the results of its daily examinations of the water of the four tunnels through which the public supply is drawn from the lake. These tabulations were made for two equal periods—one before, the other after, the sewer's diversion referred to, and they show that, before the diversion, the four-mile tunnel water was 13 per cent. inferior to the Lake View supply, taken two miles from shore; while since the diversion it has been 66 per cent. better than the Lake View, or a total improvement of nearly 80 per cent. —the four-mile supply now ranking, as it should do, the highest in sanitary quality. They show also an improvement of nearly 50 per cent. in the quality of the Chicago Avenue tunnel supply, which was likewise frequently affected by the discharge of these sewers.

The results upon the public health are seen in the following figures: Total deaths from the impure-water diseases, Jan. 1 to March 31, 1898, 540; for the corresponding period this year, 327 —a saving of 213 lives in the first three months of 1899, as com-

pared with the corresponoding period before the sewer's c
At the value of human life fixed by the State Legislature
$5,000, this is a first instalment of $1,065,000 to be plac
credit of the intercepting-sewer system.

In this connection Mayor Harrison paid the following
tribute to the City Health Department:

"The tabulations and deductions indicate, among othe
the unceasing vigilance of the Health Department in al
affecting the public health. In many respects it now stanc
the very foremost of similar establishments in the world.
the first to use the glycerinated vaccin, which has done
popularize vaccination than anything in this connection s
ner's day. Its work in the treatment of diphtheria, by w
mortality of the disease in this city has been reduced fr
than 35 to less than 7 in every hundred cases treated by its
inspectors; its investigations of the germ of influenza
resulting improvement in the methods of dealing with this
and, still more recently, its identification of the organism
fever, which makes it possible that this scourge of the nurs
be handled as successfully as diphtheria now is—are a
the attention of sanitarians both in this country and abroac
have been characterized by the highest authorities as 'rem
'brilliant,' 'nothing short of marvelous,' and the British
Journal has editorially commended to the attention of t
Government Board of London the 'sanitary machinery of
in dealing not only with smallpox, but with diphtheria a
dangerous infectious diseases.'

"Chicago has reason to be proud of its department of h
Journal American Medical Association, April 15, 1899.

NEW METHOD OF WATERPROOFING PAPER.—The Gern
nal "Neueste Erfindungen" describes the following m
making a waterproof paper: The sheet is coated on both s
a solution consisting of 1 part gelatine, 4 parts water a
glycerine. When dry, the paper is immersed in a 10
solution of formalin. After this treatment, the paper i
become impervious even to steam.—Journal of the Fra
stitute.

MEDICAL EXCERPT.

By T. P. Corbally, A. M., M. D.

ARMY SANITATION IN ARGENTINA.

The 16th of December last will deserve a very important place in the annals of the Sanitary Department of the Army of the Argentine Republic. The Department of Military Hygiene and the actual condition of the army was officially inspected (Anales de Sanidad Militar, Buenos Aires, Enero, 1899) by the Ministro de la Guerra—Secretary of War—General Luis Maria Campos, who thus honored the Sanitary Department by presiding at the meeting of the board and taking notes of the defects in the sanitary condition and of the requirements of the department.

The special object of the official visit of the Secretary of War was to listen to the report of the visit made to the different encampments of the north and central parts of the Republic by the Surgeon-General of the Army, Dr. Villar. The Secretary, who had previously announced his intention to be present at the session, was deeply interested in the report of the Surgeon-General.

It is evident that we have entered on a new field of inquiry and one that will, no doubt, be marked by real and beneficial progress. The result of the inquiry will be that sanitation and the Medical and Surgical Departments of the Army will occupy a more important and more useful place in the service than heretofore.

Appendicitis in the Army.—M. Delome, in a statement to the Académie de Médicine (Le Progrès Medical, April 1), has shown that statistics presented by M. Chomel places the mortality too great. The morbidity has not been recorded with sufficient exactness. Many of the lighter attacks that have been cured in the wards have not been carefully diagnosed. The results of cases treated by Mr. Delome have been much more satisfactory. In eight years he lost in the military hospital of Val-de-Grace only four of the patients on whom he operated; at Chalons, of thirteen cases operated on, all were cured. Prompt intervention was the rule in all cases by M. Delome. In some special cases he divides

the operation into two parts; in the first he favors the pro
of adhesions, in order more safely to open the central lesion
three days later. This course, followed in order to avoid
fection of the peritoneal organs in the course of the operat
deems of great importance.

TORTICOLIS.—M. Berger recently presented a case to the
émie de Médecine (Gazette Hebdomadaire, April 16), wl
calls obstetrical torticolis—no doubt the congenital form.

A boy ten years old, who was under his care, had unde
subcutaneous tenotomy of the two principal heads of the
mastoid. The operation was followed with manipulations
ferent kinds, by massage and orthopedic treatment, directe
deviations of the spine, which had been caused by the tortic

This case derives its interest principally from the comp
ture of the resulting deformity which consisted in a dimun
the vertical and transverse diameters of the face on the si
tracted (the right) in an oblique ovular conformation of
nium, which was increased by a triple flexion of the spine,
ing first cervical convexity on the left side, a dorsal conve
the right and finally a compensating lumbar convexity on
This last deviation has completely disappeared in consequ
the correction of the head obtained by the section of the
clido-mastoid by means of massage and appropriate
movements for the development of the muscular and other

M. Berger insists on the importance of the orthopedic tr
that should follow the operation, be continued for months
applied with the greatest care and intelligence. He is a w
vocate of subcutaneous section of the sterno-clido-mastoid
cases, because of his conviction of its necessity. M. Ber
never seen a case of congenital torticolis that resisted this o
which is much more appropriate and more successful than
wound and presents no greater danger.

The advantage of subcutaneous tenotomy is that it le
cicatrix, a very important consideration, especially in yc
males.

If the results of tenotomy are not satisfactory, the musc
be divided, and the removal of the sterno-clido-mastoid
proposed for extreme cases by Mukulicz, an operatio
should not be employed except in extreme cases, not one
has as yet come under the observation of M. Berger.

DIURETICS.—The Action of Certain Substances on Diuresis:—MM. E. Bardier and H. Frenkel have presented a memorial to the Congrès des Sociétés des Savants (Progrès Médical, April 15) in which they state that if the proposition of M. Bouchard that the kidneys do not well eliminate salicylate of soda can be accepted, and that in pathological conditions diuresis is prevented by that substance, the same objections does not apply to its action in healthy persons. In the healthy man clinical observers generally admit the diuretic action of the salicylate of soda, yet there are some who regard it as counter-indicated both by clinical observation and by experiment. Quite recently M. Siegert has denied that salicylate of soda has diuretic action, and while attributing to it the opposite quality, he has thought it his duty to warn the practitioner against its use for the purpose of rendering caffein soluble, and has advised that the benzoate of soda be substituted for it. Surprised at this conclusion, we have instituted a series of experiments for the purpose of comparing the action of caffein when associated with the salicylate or the benzoate of soda. As in all our experiments, we have, in this case, operated on dogs with the aid of urethral canules.

We counted the number of drops falling from the ureters, minute by minute, during two or three consecutive hours; at the same time the impression on the general and the renal circulation was accorded before and after the injections. In these conditions we found that the caffein, whether associated with the salicylate or the benzoate of soda, greatly increased the flow of urine, and we could not find any difference in the effect of the two remedies. The general pressure, after a light and transient flow, increased about 30 to 40 millimetres for a medium dose of one centigram of caffein to every kilogram of the weight of the animal. It attained its maximum force at the expiration of two minutes and remained for several minutes about the initial pressure. In the kidney a vaso-constriction was observed, which generally did not last more than 30 seconds. The salicylate of soda certainly increases the quantity of urine, causes a slight increase in the general pressure and produces a renal vaso-dilatation; while the benzoate of soda simply elevates by a few millimetres the general pressure, and does not produce any perceptible modification in the renal circulation.

Finally, there is no reason for supposing that salicylate of soda diminishes the diuretic effects of caffein. If it cannot be said that the salicylate of soda is better than the benzoate as a diuretic, we

think that we are fully justified in affirming that it is not degree inferior.

THE URIC ACID DIATHESIS.—For diseases arising fro cause Lambert's lithiated hydrangea has been used with ex results in the Buffalo Dispensary for nearly a year (Buffalo ical and Surgical Journal)in cases of vesical irritation, and rect a uric acid diathesis. The combination of the salts of with hydrangea is a happy one, and we are persuaded that ir cases we get more satisfactory results from the use of Lan lithiated hydrangea than we do from any other preparation Wm. B. Gray, of Richmond, Va., also reports (Lancet-C that when the urine is of high specific gravity, by reason presence of an abnormal amount of uric acid, Lambert's lit hydrangea, in his hands, has never failed to be of signal b In cases in which the specific gravity exceeds 1.015, it inva gives good results.

CONVULSIONS DURING PREGNANCY.—Can Such Mothers Their Children?—MM. Budin and Chavanne report to the S d'Obstétrique de Paris (Progrès Médical, April 1) that it i important to know if women who had spasms or convulsion ing pregnancy should nurse their children after confin Ducros and Cassin, in their thesis on the subject, conclu opposition to the practice. Gannelin, in a work published in relying on observations of women, not only during their res in the hospital, but even after their departure, think that women can safely nurse their children. We have carefully tinued our observations on such cases since 1892 and noted t sult of infants nursed by women having albuminuria at the ité, at the Maternité and also at the Clinique Tarnier. The r thus obtained have been satisfactory, as shown by the con of the children observed during the entire first year. The ishment was exclusively the mother's milk, except in one c which 250 grams of sterilized milk was given for a short Nearly all the women recovered completely and speedily fro albuminuria. In a few cases in which the albuminuria per for some months the mothers were still allowed to nurse thei dren.

In conclusion we would say that albuminuria, even in quantity, does not render it necessary for the mother to cease ing her child.

PENETRATING WOUND OF ABDOMEN.—M. Tuffier presented the case of a woman three months pregnant, who was accidentally wounded in the left side by a pistol ball. Laparatomy was performed an hour and a half after the accident. The gravid uterus rendered it possible to discover eight perforations of the intestine, which were sutured without the escape of any of the contents of the intestine into the abdominal cavity. Results satisfactory. Patient cured and carried her child to term.

"VIN MARIANI," says the St. Louis Medical and Surgical Journal, May, 1899, is essentially the brain and nerve tonic of those who have talent and genius. These compose the great army of intellectual workers, and the ravages made on their nervous systems by the demands made upon them are at times truly appalling. This damage and consequent drain yield to nothing more quickly than to "Vin Mariani." The most noted European physicians, litterateurs, musicians, singers, artists and diplomats have sent the most flattering letters to M. Mariani extolling his product. Not only these but crowned heads as well have been mentally invigorated and rejuvenated by "Vin Mariani" and never tire of speaking words in its praise. It must be acknowledged that unsolicited testimonials, couched in such glowing terms, from such sources, are the best evidence possible that can be offered for the merits of the preparation. When "Vin Mariani" becomes as well known in this country as it is in Europe, it will be adopted as one of the indispensable remedies in the household.

THE TREATMENT OF CONSUMPTION IN ENGLAND.—The London Spectator says: "The cure of consumption has undergone a complete transformation as to the theory of its origin and distribution. The first great revolution was the discovery that it could be treated with far better promise of success in the high Alps than in the warmer regions to which doctors of an older generation had been in the habit of sending their patients. It was as a result of this discovery that Davos Platz rose into fame. The success of the new plan was remarkable. Patients who seemed not to have twelve months to live found that by passing every winter in Switzerland they might hope to go on for years. Now, however, further investigations and experiments have led to a fresh discovery. What is so valuable in the Swiss treatment is not the air of the Alps but the *air*. People who in England would have been shut up in their rooms all the winter have been encouraged to be a

great deal out of doors, and have gained fresh life and strength by the process. Air is the secret of the cure, and experiments carried out in district so unlike as Edinburgh, Norfolk and Ireland have convinced the medical profession that treatment which at Davos or St. Moritz is of necessity costly may be had at home at a comparatively small outlay. Sanatoriums are about to be built in London and at York, and by and by doubtless they will be as common as hospitals. Further experience will probably suggest fresh developments of the open-air system and will make it possible for patients to profit by it in their own homes. The association has abundance of work before it, but it begins its labors with the most encouraging prospects."

THE CANCER MICROBE.—The Paris Figaro has announced that Dr. Bra has found the microbe of cancer, and that there is reason to hope that the discovery may soon lead to a certain cure of that dread disease. Dr. Bra is modest and cautious in his statements, saying that it must be months before a definite announcement would be possible. What he has succeeded in doing, however, is to isolate and cultivate a parasite from cancerous tumors and to produce therefrom cancer in animals. The parasite is fungus-like and is certainly the specific agent of cancer. Dr. Bra has spent some four years in his researches on the origin of cancer.

EXPERIMENTS WITH ORTHOFORM.—Some interesting information is given in the Revue Scientifique recently concerning this new German anæsthetic, for which much has been claimed. Applied in powder or ointment to a wound or raw surface, orthoform renders it insensible, a fact confirmed by repeated clinical observation, and in extensive burns, especially, orthoform is found to allay the severest pains in a few minutes, the relief enduring for hours, and, being non-poisonous, there is no danger in reapplying it as often as may be required after the first effect has ceased. Thus, in case of ulcerated cancer of the face, where constant and excruciating pain rendered sleep impossible, this powder, to the amount altogether of fifty grams, on being dusted over the sore for a whole week, resulted in cessation of the pain, and no ill effects following. The remedy is also found equally safe and effectual when administered internally as an anodyne in cancer of the stomach.

BUVEURS DE PETROLE.—Truly there is no accounting for taste. We are aware of the fact that individuals do exist who "to keep

their spirits up" do so "by pouring spirits (rectified and methylated) down," also that others have a partiality for ether as a "pick-'em-up;" but it is to Paris we must grant the palm for the vilest "taste" in the choice of a stimulant. A Parisian journal informs us on good authority that there exists in the gay capital what are called "buveurs de pétrole," or "petroleum drinkers." True, the baneful and disgusting habit is only peculiar to the Bastille quarter as yet; still, it is spreading with alarming rapidity and is an unforeseen and additional monster to the list which the temperance societies will have to deal with. When the discovery was made it was thought the habit was the direct result of the increased tariff on alcohol which had lately been imposed, and which, of course, in proportion affected the price of even the laborer's cheap and nasty "petit verre;" but it transpires that such is not the case, inasmuch as the habit existed long before the sur-tax on alcohol was thought of. Moreover, it appears that these "petrolies" have a marked preference for this illuminating medium, possibly because, as it is asserted, "there is no headache in the bottle." Nevertheless it is an acquired taste like that for tomatoes. The species of intoxication produced by this new drink somewhat differs from that of ordinary alcoholic beverages in that the "petrolie" is exceedingly morose, though less inclined to brutality. His sleep is calm and natural, and upon awakening he seems none the worse for his little tipple, apparently enjoying his usual health. As to its ultimate effect upon his system, doctors in this, as in all other cases, agree to differ. Some declare it to be harmless if used in moderation, it being a capital vermifuge and anti-spasmodic, while others say that in all proportions it is dangerous, for it is palpably conducive to derangements in the organism and creates the germs of moral maladies. This new problem is, however, sufficiently interesting to merit profound study.—English Pharmaceutical Journal.

Alcoholism in Children.—In Le Progrès Médical, February 18, we see that the authorities of Bonn have investigated the question of alcoholism among the pupils of primary schools. The results are far from satisfactory. Sixteen children out of one hundred absolutely refuse to drink milk, because they say that this beverage lacks flavor. Out of two hundred and forty-seven pupils between the ages of seven and eight years, they did not find one who had not already drunk wine, beer or spirituous liquors. Twenty-five per cent. had not tasted spirituous liquor, but habitually drank beer or wine. Eight per cent. received daily from the

hands of their parents a glass of spirituous liquor to "make th grow strong." Some were habituated to the use of cognac. was shown that children accustomed to alcohol were intellectu inactive. Those who had for breakfast a glass of liquor or c nac betrayed the fact by their inattention during the first part the morning. The singular fact was revealed that more you girls drank cognac or liquor than boys. It is highly probable t an investigation of this question in the city of Paris would veal even a worse state of affairs.

PURITY OF LONDON WATER.—Professors Crookes and Dew in an official report showing the composition and quality of d samples of the water supplied to the city during the month of S tember last, state that of the 182 samples analyzed by them all w found to be clear, bright and well filtered. The analysts rem that the bacteriological quality of the London water supply d not depend on the use or rejection of flood-water, but upon proper regulation and the efficiency of the filtration; this has l been conducted substantially under the supervision of the offi water examiner of the metropolis. The direct use of water fr the river during a prolonged flood, depending somewhat on time of year, may result in the filtered supply containing in so tion a little additional vegetable matter, slightly adding to brown color, but rarely, if ever, is the color of the London wa supply, in its most peaty condition, equal to the average colo Loch Katrina or the Welsh lakes.

DISEASES OF ANIMALS IN GERMANY AND ITALY.—Consul Ba writes from Kehl, under date of January 20, 1899, that the m rain and foot rot have been reported to exist among animals Alsace-Lorraine for the last eight or ten eweks. They are fo not only in rural districts, but in cities, especially in dairy es lishments. The report of the statistician of Strassburg states at the end of December, the disease was epidemic within the lim of eighty-six municipalities. Cattle to the number of 2,500 hundreds of hogs, and also some goats, were infected.

Consul Cramer, of Florence, on January 10, 1899, says that horses of the city are afflicted with intestinal inflammation, acc panied with derangement of the brain. The disease is ende and infectious, and of 300 horses attacked, 35 have died.

Copies of these reports have been sent to the Departmen Agriculture.—Consular Reports, No. 223.

EDITOR'S TABLE.

SANITARIAN, JUNE, 1899.

☞All correspondence and exchanges, and all publications or review, should be addressed to the Editor, Dr. A. N. Bell, Brooklyn, N. Y.

PRIZE HEALTH RULES.

Many attempts have been made from time to time to formulate a sanitary decalogue. The most recent one is the result of a Parisian enterprise in 1897, offering a prize for the best code of hygienic rules, not to exceed ten in number, for the preservation of mental and bodily health. We have now the result of the competition, which is a mere deduction from common sense observations rather than hygienic rules—a laconic statement of wholesome truths known and practised ever since Moses' time. The rules, translated for and published in the London Lancet, are as follows:

1. General Hygiene: Rise early, go to bed early, and in the meantime keep yourself occupied. 2. Respiratory Hygiene: Water and bread sustain life, but pure air and sunlight are indispensable for health. 3. Gastrointestinal Hygiene: Frugality and sobriety are the best elixir for a long life. 4. Epidermal Hygiene: Cleanliness preserves from rust; the best-kept machines last longest. 5. Sleep Hygiene: A sufficiency of rest repairs and strengthens; too much rest weakens and makes soft. 6. Clothes Hygiene: He is well clothed who keeps his body sufficiently warm, safeguarding it from all abrupt changes of temperature while at the same time maintaining perferct freedom of motion. 7. House Hygiene: A house that is clean and cheerful makes a happy home. 8. Moral Hygiene: The mind reposes and resumes its edge by means of relaxation and amusement, but excess opens the door to the passions and these attract the vices. 9. Intellectual Hygiene: Gaiety conduces to love of life and love of life is the half of health; on the other hand, sadness and gloom help on old age. 10. Professional Hygiene: Is it your brain that feeds you? Don't allow your arms and your legs to become ankylosed. Dig

for a livelihood, but don't omit to burnish your intellect and elevate your thoughts.

The winner is Dr. Decornet of Ferte-sur-Aube, who won over 500 selected competitors.

There is not in the list a single new truth, nor an old one newly put. Yet they may serve a good purpose by their restatement. But why a prize should have been awarded for that which all sensible persons may be assumed to know, can hardly be explained by any one else than by those who awarded it.

A DANGEROUS DRUMMER.

Morganfield, Ky., April 19, 1899.—A traveling man came to Morganfield to-day who is on his mettle concerning compulsory vaccination, and threatens to take the warpath should the authorities attempt to vaccinate his children. His name is W. J. Lewis, and he hails from Horse Cave, Ky. Lewis is a licensed lawyer, and is only temporarily on the road. He mailed the following warning to the officers at Horse Cave this evening:

"Morganfield, Ky., April 19.—To the Honorable Officers of the Town of Horse Cave, Ky., of Hart county: I am informed that you have ordered all of the people of Horse Cave to be vaccinated. It is presumed you know what you are doing. If you have made such an order, with all due respect to the officers of the law and with all due respect to the practising physicians of Hart county, and the medical profession of the State of Kentucky, allow me to give you this warning. My children are my children. There is no higher power over them than myself, except the God in the Heaven, who is above us all. It is not in my heart to hurt or harm any man, but I make a frank statement that if I am living I will shoot the man who vaccinates or attempts to vaccinate one of my children. I trust nothing that I now warn the public against shall happen. I absolutely and truthfully and intelligently mean exactly what I say, with all due respect to those who may differ with me upon the subject, as I believe it to be a complete poisonous humbug. W. J. LEWIS."

But what should be done with the said Lewis, if by neglect of vaccination for himself or for his children, he or they contract smallpox and give it to his neighbors, or it may be to a community? Would he be any less guilty than if he had put arsenic in the

town-pump and by that means poisoned the multitude? For every life so lost, he would rightly be chargeable with manslaughter. For, with no respect whatever for the health and lives of others, for a mere whim, and in virtue of what he considers a personal right, he would sacrifice the lives of a multitude! Such a person is dangerous to any community and should be deprived of liberty.

DIRT IS CATCHING.—No city which tolerates dirty streets can enforce ordinances against sweepings into them. That is why merchants and others, seeing the streets constantly belittered and dusty, calmly sweep their own refuse into the gutter—on the principle that a little more doesn't hurt—they are used to it.

On the contrary clean streets beget cleanliness. No decent merchant or other person who habitually looks out upon a clean street will sweep dirt or rubbish of any kind into it.

School children accustomed to pass through dirty streets daily can hardly be taught cleanliness; and the teachers, too, become careless of cleanliness when they observe that it is not esteemed by the public authorities. The public, with its paid employees, can well afford to maintain a standing example of cleanliness. It is only by so doing that filth diseases may be prevented.

DISINFECTION OF CARS.

According to the Philadelphia Medical Journal, experiments which have been made in Berlin show that the railway cars are vehicles for carrying and spreading infectious diseases. Dr. Petri, of the Imperial Sanitary Bureau, in conducting the experiments, found that of ninety-one animals inoculated with material, principally expectoration, obtained from the interior of railway carriages, nearly one-third died as a result, while of the remainder, several, on being killed, were found to have become tuberculous. This shows that the sanitary laws should be strictly enforced and, further, that some proper and effective method of disinfecting public conveyances should be adopted. There could be no more certain way of spreading smallpox, than by street cars. Smallpox patients, as well as persons suffering from other infectious and contagious diseases, frequently go about when in a condition to communicate the disease. They can infect the cushions upon which they sit so that others, following them, can take the disease. The public safety demands scrupulous cleanliness at all times, and

the frequent disinfection of street cars, as well as steam railway cars, and it should be done. It can be done with ease and at small expense. As the Medical Journal remarks, while we may not hope entirely to eradicate transmissable diseases, the observance of a few sensible regulations will go far to diminish their prevalence and restrain their spread.

SCHOOL OF PUBLIC HEALTH.

The Council of New York University has set apart buildings near First avenue, between Twenty-fifth and Twenty-sixth streets, for the use of a "School of Public Health," as provided for by the law passed at the recent session of the Legislature, and for which $25,000 was appropriated for maintenance for the year beginning October 1, 1899. It is proposed to promote public sanitation in various ways, especially to instruct properly accredited medical and lay sanitary officers throughout the State in methods and appliances for the prevention of disease. The public will be instructed in sanitary matters by University extension work. It is expected that a hygienic museum will be established for the collection and exhibition of all forms of sanitary appliances and models in plumbing, ventilation, disinfection, heating, clothing, and other kindred subjects to be open to the public.

AN INTERNATIONAL SANITARY LEAGUE.

It is stated in the Medical Times and Hospital Gazette that Prince Orbeliana, a Russian nobleman, proposes to establish an International Sanitary League to supply a complete staff of bacteriologists, medical officers, chemists and nurses (all of whom have gone through training in actual contact with epidemics), to deal with outbreaks in any country that may be affected. The prince sees no reason for counting absolutely on the supposed immunity of Europeans in the present day against plague, which formerly carried off the inhabitants of the cities of Europe by the hundred thousand. Large numbers of people in European countries, he argues, live in conditions almost as favorable to epidemics of plague as those that prevailed when London, Moscow, Marseilles, Milan and Naples suffered so terribly by it. In order to meet a danger which in a large measure affects all countries alike, it is suggested that the means of resistance should be placed on a better and an international footing.

GERMAN SOCIETY OF PUBLIC HYGIENE.—Drs. Rubner and Leyden (Berlin) are the initiators in the organization of a German

Society of Public Hygiene whose aim is: 1, to diffuse the knowledge of hygiene and the results of hygienic research; 2, to take active part in all social questions which pertain to public health; and 3, to encourage and assist all such practical undertakings which purport to further public health.

THE NEW SKENE HOSPITAL.—Articles of incorporation of the society in Brooklyn known as the "Skene Hospital for Self-Supporting Women," were signed May 4. It will be remembered that Dr. Skene resigned the presidency of the Long Island College for the purpose of assuming the management of this new enterprise. Dr. Charles Jewett has succeeded Dr. Skene as president of the college.

MORTALITY AND MORBILITY REPORTS AND REVIEWS.

Correspondents under this head are particularly requested to be as prompt as possible.

NEW YORK, 7,110,000. By Secretary's Bulletin for the month of March, 1899: Total number of deaths, 11,065; under 5 years, 2,807; annual death rate per 1,000, 19.0; deaths from cerebro-spinal meningitis, 82; typhoid fever, 121; malarial diseases, 12; smallpox, 1; scarlet fever, 98; measles, 61; erysipelas, 40; whooping-cough, 73; diphtheria, 220; diarrhœal diseases, 126; acute respiratory diseases, 2,145; consumption, 1,284; puerperal diseases, 81; digestive system, 726; urinary system, 838; circulatory system, 1,052; nervous system, 1,290; cancer, 418; accident and violence, 419; old age, 588; unclassified, 1,300.

City of New York, 3,550,053, March, 1899: Total deaths, 5,671; under 5 years of age, 1,828; annual death rate per 1,000, 18.85; from cerebro-spinal meningitis, 50; typhoid fever, 21; malarial diseases, 6; smallpox, 1; scarlatina, 75; measles, 59; erysipelas, 23; whooping-cough, 41; diphtheria, 147; diarrhœal diseases, 51; acute respiratory diseases, 1,112; consumption, 786; puerpeal diseases, 50; digestive system, 348; urinary system, 475; circulatory system, 449; nervous system, 559; cancer, 192; accident and violence, 242; old age, 120; unclassified, 864.

New York City, Borough of Manhattan, 1,953,569. Total deaths, 3,232; under 5 years, 1,065; annual death rate per 1,000, 19.5; from typhoid fever, 12; diphtheria, 77; phthisis, 437; acute respiratory diseases, 653.

Borough of the Bronx, 163,537: Total deaths, 302; under 5 years, 98; annual death rate per 1,000, 21.7; from

typhoid fever, 2; diphtheria, 22; phthisis, 77; acut ratory diseases, 37.

Borough of Brooklyn, 1,231,548: Total deaths, under 5 years, 585; annual death rate per 1,00(from typhoid fever, 6; diphtheria, 40; phthisi acute respiratory diseases, 345.

Borough of Queens, 134,139: Total deaths, 201; 1 years, 70; annual death rate per 1,000, 17.7; fro theria, 3; phthisis, 18; acute respiratory diseases

Borough of Richmond, 67,260: Total deaths, 96 5 years, 12; annual death rate per 1,000, 17.(diphtheria, 5; phthisis, 9; acute respiratory disea

The Sinking Fund Commissioners have decided to lease Health Department for ten years at $10,000 a year the o York Athletic Club Building, at Fifty-fifth street and Sixth The Health Department's occupancy of quarters in the C Court Building has long been a source of discontent am judges who sit in that building. Only a month ago Dist torney Gardiner made a complaint about the matter to the Fund Commissioners, saying that the bacteriological lal was a menace to the health of those in the building, and odors from the chemical laboratory were extremely offensi

Albany, 100,000: Total deaths, 213; under 5 years, 61; death rate per 1,000, 25.5; from typhoid fever, 14; dip 2; phthisis, 34; acute respiratory diseases, 38.

Troy, 65,000: Total deaths, 111; under 5 years, 21; annu rate per 1,000, 20.5; from typhoid fever, 9; phthisis, 1 respiratory diseases, 26.

Utica, 55,000: Total deaths, 82; under 5 years, 15; annu rate per 1,000, 17.0; from diphtheria, 2; phthisis, 1 respiratory diseases, 10.

Syracuse, 120,000: Total deaths, 120; under 5 years, 22; death rate per 1,000, 12.0; from typhoid fever, 2; dip 1; phthisis, 18; acute respiratory diseases, 15.

Buffalo, 360,000: Total deaths, 304; under 5 years, 144; death rate per 1,000, 13.1; from typhoid fever, 7; dip 6; phthisis, 33; acute respiratory diseases, 75.

Rochester, 175,000: Total deaths, 206; under 5 years, 22 death rate per 1,000, 14.1; from typhoid fever, 2; dipht phthisis, 25; acute respiratory diseases, 41.

Yonkers, 42,000: Total deaths, 85; under 5 years, 22 death rate per 1,000, 23.7; from acute respiratory diseas

Cohoes, 25,000: Total deaths, 48; under 5 years, 11

death rate per 1,000, 23.0; from phthisis, 6; acute respiratory diseases, 17.

Kingston, 25,000: Total deaths, 50; under 5 years, 13; annual death rate per 1,000, 24.0; from phthisis, 2; acute respiratory diseases, 13.

Poughkeepsie, 25,000: Total deaths, 54; under 5 years, 8; annual death rate per 1,000, 26.0; from phthisis, 6; acute respiratory diseases, 5.

Newburgh, 26,000: Total deaths, 36; under 5 years, 8; annual death rate per 1,000, 17.5; from phthisis, 4; acute respiratory diseases, 3.

Schenectady, 27,000: Total deaths, 46; under 5 years, 10; annual death rate per 1,000, 19.5; from phthisis, 3; acute respiratory diseases, 11.

Binghamton, 45,000: Total deaths, 61; under 5 years, 9; annual death rate per 1,000, 16.2; from phthisis, 7; acute respiratory diseases, 9.

Elmira, 35,000: Total deaths, 55; under 5 years, 16; annual death rate per 1,000, 19.0; from phthisis, 4; acute respiratory diseases, 17.

Oswego, 22,000: Total deaths, 31; under 5 years, 8; annual death rate per 1,000, 17.0; from phthisis, 2; acute respiratory diseases, 5.

CALIFORNIA.—San Francisco, 360,000, March, '99: Total deaths, 650; under 5 years, 151; annual death rate per 1,000, 21.6; from typhoid fever, 10; diphtheria, 12; consumption, 90; acute respiratory diseases,' 77.

Los Angeles, 103,000, March, '99: Total deaths, 160; under 5 years, 18; annual death rate per 1,000, 15.5; from diphtheria, 2; consumption, 29; acute respiratory diseases, 15.

COLORADO.—Denver, 167,000, March, '99: Total deaths, 192; under 5 years, 30; annual death rate per 1,000, 13.8; from phthisis, 44; acute respiratory diseases, 21.

CONNECTICUT.—The Secretary of the State Board sums up, 167 towns, 892,435, March, '99: Total deaths, 1,221; under 5 years, 251; annual death rate per 1,000, 16.4; from typhoid fever, 2; diphtheria, 13; phthisis, 122; acute respiratory diseases, 211.

New Haven, 112,000, March, '99: Total deaths, 157; under 5 years, 32; annual death rate per 1,000, 15.9; from typhoid fever, 1; diphtheria, 2; phthisis, 18; acute respiratory diseases, 20.

Hartford, 80,000, March, '99: Total deaths, 145; under 5 years, 36; annual death rate per 1,000, 202; from typhoid fever, 1; phthisis, 16; acute respiratory diseases, 27.

Bridgeport, 65,000, March, '99: Total deaths, 73; under 5 years, 24; annual death rate per 1,000, 12.9; from phthisis, 7; acute respiratory diseases, 9.

Waterbury, 45,000, March, '99: Total deaths, 54; under 5 years, 16; annual death rate per 1,000, 14.4; from phthisis, 5; acute respiratory diseases, 11.

Twenty-first annual report, for the year ending August 31, 1898; and Registration Report of the Bureau of Vital Statistics for the year ending Dec. 31, 1897. 8vo. Pp. 348 and 197. Following a summary of the work and the minutes of the quarterly meetings for the year, the secretary follows with a twenty years' retrospect since the organization of the board, July 1, 1878, which he felicitously concludes with the present status, as follows:

"Under the above sanitary laws the health officials of the whole State are now organized as one body, acting in concert by systematic methods.

"Codes of local sanitary regulations have been adopted, uniform in character, and are in force in every town. Frequent meetings of the health officers have been held in every county for mutual conferences and exchange of experiences, at which have been present the county officers and one or more members of the State Board. These gatherings have been a very profitable school of instruction to those who have attended them, and will reflect much advantage upon the towns which they represent.

"In place of the spasmodic attempts at sanitary work, in shreds and patches, as practised twenty years ago, there has grown up, under the guidance and direction of the State Board of Health, a public sentiment no longer opposed to, but actively interested in and co-operating with, all proper efforts at sanitary progress; a much improved code of sanitary laws; a body of trained and instructed sanitarians, officially safeguarding the public in every town against dangerous infectious diseases and other death-dealing influences; and a well-organized plan of operations, uniting the two branches of sanitary administration as parts of one system, working harmoniously and effectively throughout the whole State.

"It is also a part of the history of the board to be duly mentioned, that it has, with the aid of experts, investigated all the important epidemics which have occurred during its career, and traced most

of them to their origin. By thus exposing the causes of such epidemic outbreaks it has contributed much to the prevention of others."

The healthfulness of the State, as indicated by the prevalence of preventative diseases, is reported to have been quite up to the standard of the past years. Scarlet fever was reported in 92 towns, but of so mild a type that the death rate was only 2.7 per cent. of the whole number sick.

Diphtheria in 102 towns, with a death rate of 24.6 per cent. Typhoid fever in 154 towns, with a death rate of 26.6 per cent. The high mortality is attributed to the large number of cases imported into Connecticut from the military camps. Measles was reported in almost every town—the whole number of cases reported being 3,744, but there were probably twice as many, and it is in evidence that not more than one per cent. of them was fatal.

Of consumption, Connecticut has had an annual mortality for the last ten years of over 1,400 deaths, all of which is attributable to avoidable conditions.

The death rate for the whole State for the year ending Sept. 30, 1898, was 15.4.

It is observed as an interesting fact that although the very contagious diseases mentioned have been widely prevalent, yet with very few exceptions no serious epidemics have occurred, except in the military hospitals.

The registered mortality in 1897, exclusive of (915) still births, numbered 13,915—1,110 less than in the preceding year. The death rate upon the estimated population of 883,192 was 15.7 per 1,000 living. Deaths from zymotic diseases, exclusive of consumption, 2,312—16.61 per cent. of the total mortality.

Phthisis, 1,306—9.38 per cent. of total mortality.

Governor Lounsbury makes two new appointments to the State Board of Health in place of Dr. N. E. Wordon, of Bridgeport, and George P. Ingersoll, of New Haven, whose terms will have expired. His selections are Dr. E. K. Root, of Hartford, and Attorney Henry G. Newton, of New Haven, who will be the legal member of the board. Both appointments are for six years, from July 1, 1899.

DISTRICT OF COLUMBIA.—280,250, 3 weeks, April 15, '99: Total deaths, 342; under 5 years, 63; annual death rate per 1,000,

20.8; from typhoid fever, 7; diphtheria, 4; phthisis, 42; acute respiratory diseases, 62.

April 16.—There have been forty-nine deaths in Washington from *cerebro-spinal meningitis* since the first day of last February. In other words, more deaths have occurred from this disease in ten weeks than in the two entire years of 1897 and 1898. The total for the two years was only forty.

Report for the year ending June 30, 1898: Population, white, 191,478; colored, 88,772: 280,250. Total deaths, 5,415: 2,973 white; 2,442 colored. Death rates: White, 15.53; colored, 27.51; 19.39.

Deaths from zymotic diseases, exclusive of phthisis, 892—16.4 per cent. of total mortality. The chiefly prevalent diseases of this class were scarlet fever, of which there were 437 cases reported with a morbidity rate of 1.57 per 1,000, and diphtheria, of which there were 700 cases reported, with a morbidity rate of 2.52 per 1,000 and a percentage of fatal cases amounting to 13.5. Deaths from phthisis, 12.32 per cent. of total mortality, excluding pulmonary tuberculosis; the number of deaths reported as due to diseases of the respiratory organs was 668—12.34 per cent. of the total mortality.

FLORIDA.—45 counties and 5 cities, aggregating 464,639 inhabitants, give a mortality for February, 1899, of 316, of which 83 were under 5 years of age. Annual death rate, 8.03 per 1,000. Typhoid fever caused 4 deaths; diphtheria, 2; consumption, 37; pneumonia, 32.

ILLINOIS.—Chicago, 1,650,000, March, '99: Total deaths, 2,343; under 5 years, 781; annual death rate per 1,000, 14.4; from typhoid fever, 18; diphtheria, 55; phthisis, 226; acute respiratory diseases, 584.

State School for the Instruction of Health Officers. Springfield, April 28.—Approval has been given by the State Board of Health to the plan proposed for establishing at the University of Illinois a school for the instruction of municipal health officers throughout the State, with particular reference to sanitation and hygiene.

The school will be organized and conducted by the faculty of the University and every health officer in the State will be required by law to take a limited course of instruction there at the beginning of his term of office. Such a school has been a great success

in Ohio, where it is maintained in connection with the Ohio State University at Columbus.

The New Medical Practice Act.—On May 1 the new medical practice law went into effect and the board approved rules to govern the examination of physicians and surgeons and other practitioners who come within its scope. Besides presenting diplomas from reputable schools of medicine which are defined in the rules, applicants will be examined in anatomy, physiology, chemistry, pathology, histology, obstetrics, gynecology, materia medica and therapeutics, practice of medicine and medical jurisprudence. Persons who act in certain cases, but do not administer medicine or perform surgical operations, will be examined in anatomy, psychological clinics, physiology, histology, pathology and hygiene.

IOWA.—Des Moines, 72,000, March, '99: Total deaths, 59; annual death rate per 1,000, 8.2; from phthisis, 5; acute respiratory diseases, 11.

Davenport, 36,000, March, '99: Total deaths, 45; annual death rate per 1,000, 12.3; from phthisis, 4; acute respiratory diseases, 6.

LOUISIANA.—New Orleans, April 16: The request made by the Mississippi State Board of Health in its resolutions of February 4 has been granted by the Louisiana Board of Health without any difficulty. In fact the board had already framed resolutions to the effect that the inspectors of adjacent States should be informed by the president of all cases of yellow fever reported to him for investigation, and also resolutions allowing the inspection of the charity hospitals by the same inspectors, and the same courtesies are expected by the Louisiana State Board of Health from the Mississippi Board should it desire to send inspectors into Mississippi, which are granted.

New Orleans, 300,000 (90,000 colored), March, '99: Total deaths, 689—292 colored; under 5 years, 152; annual death rate per 1,000, white, 18.9; colored, 32.4; 22.9. Deaths from typhoid, 5; consumption, 99; acute respiratory diseases, 107. April 18: The sewerage and drainage petition has received the requisite number of signatures, and the Council can now pass the ordinance ordering the tax election.

MARYLAND.—Baltimore, white, 463,000; colored, 78,000: 541,000. February: Total deaths, 895—669 whites, 226 colored: death

rates, 20.57, 34.61 : 22.60; 63 died from infectious diseases, 89 from consumption, 140 from pneumonia, 27 from bronchitis, 40 from influenza, 56 from Bright's disease, 23 from apoplexy, and 8 from typhoid fever; 289 were under 5 years of age; cases of infectious diseases reported during the month, 249.

MASSACHUSETTS.—Boston, 541,827, March, '99: Total deaths, 925; under 5 years of age, 282; annual death rate per 1,000, 20.4; from typhoid fever, 5; diphtheria, 21; consumption, 128; acute respiratory diseases, 171.

MICHIGAN.—2,168,548, March, '99: Total deaths, 3,278; under 5 years, 867; annual death rate per 1,000, 16.5; from typhoid fever, 34; diphtheria, 26; phthisis, 202; pneumonia, 495.

Detroit, 237,798, March, '99: Total deaths, 409; under 5 years, 128; annual death rate per 1,000, 17.4; from diphtheria, 8; phthisis, 29; pneumonia, 62.

MINNESOTA.—Minneapolis, 225,602, March, '99: Total deaths, 200; under 5 years, 64; annual death rate per 1,000, 9.25; from typhoid fever, 2; diphtheria, 3; consumption, 22; acute respiratory diseases, 46.

St. Paul, 215,582, March, '99: Total deaths, 136; under 5 years, 57; annual death rate per 1,000, 8.2; from diphtheria, 3; phthisis, 16; acute respiratory diseases, 19.

April 24: St. Paul will virtually have a new health department to-morrow. But three of the whole force are retained by Dr. Justus Ohage, the new Commissioner of Health. The changes were announced this afternoon publicly, although some of them have been surmised for some days. The three persons reappointed are William Sharood, inspector; C. A. Janssen, meat inspector, and Miss Martha De Bruyn, stenographer.

MISSOURI.—St. Louis, 623,000, March, '99: Total deaths, 986; under 5 years, 324; annual death rate per 1,000, 18.9; from typhoid fever, 4; diphtheria, 16; phthisis, 118; acute respiratory diseases, 203. Report for the year 1898 was 8,908, of which 2,608 were under 5 years of age. The death rate was 14.2 per 1,000. From typhoid fever there were 95 deaths; diphtheria, 152; diarrhœal diseases, 466; consumption, 1,101; bronchitis, 350; pneumonia, 867.

Kansas City, 200,000, March, '99: Total deaths, 314; under 5 years, 71; annual death rate per 1,000, 18.8; from typhoid fever, 2; phthisis, 9; acute respiratory diseases, 93.

NEW JERSEY.—Newark, 235,000, 4 weeks, April 22, '99: Total deaths, 382; under 5 years, 100; annual death rate per 1,000, 20.6; from diphtheria, 7; typhoid fever, 24; phthisis, 53; acute respiratory diseases, 67.

Paterson, 114,732, March, '99: Total deaths, 220; under 5 years, 69; annual death rate per 1,000, 19.1; from typhoid fever, 20; diphtheria, 6; phthisis, 26; acute respiratory diseases, 42.

NORTH CAROLINA.—Twenty-two towns, population 150,638 (63.590 colored), report for March, '99, 171 deaths, 107 colored; under 5 years of age, 35; annual death rate per 1,000, 13.6; from consumption, 25; pneumonia, 31.

OHIO.—Cleveland, 395,000, March, '99: Total deaths, 501; under 5 years, 170; annual death rate per 1,000, 15.2; from typhoid fever, 15; diphtheria, 4; phthisis, 18; acute respiratory diseases, 108.

PENNSYLVANIA.—Philadelphia, 1,266,832, 5 weeks, April 29, '99: Total deaths, 2,614; under 5 years, 548; annual death rate per 1,000, 21.4; from typhoid fever, 195; diphtheria, 71; phthisis, 305; acute respiratory diseases, 339.

May 2: Though the epidemic of typhoid fever seems to be gradually decreasing, the death rate from the disease seems to be growing higher each day. It is now about 15 per cent. and the health authorities are considerably concerned over the virulence of the epidemic. So far this week 77 new cases have been reported, with ten deaths.

Nine new cases of cerebro-spinal fever have been recorded since Saturday, with three deaths.

Pittsburg, 305,000, 5 weeks, April 29, '99: Total deaths, 550; under 5 years, 207; annual death rate per 1,000, 18.7; from typhoid fever, 29; diphtheria, 7; phthisis, 34; acute respiratory diseases, 99.

SOUTH CAROLINA.—Charleston, 65,165, 5 weeks, April 29, '99: Total deaths, 175; under 5 years, 43; annual death rate per 1,000, 27.8; from phthisis, 21; acute respiratory diseases, 15.

TENNESSEE.—Nashville, April 28: The State Board of Health to-day engaged in mapping work during the next two years and arranging those matters which are needing immediate attention.

At yesterday afternoon's session the following resolution by Dr. Krauss was adopted:

"Resolved, by the Tennessee State Board of Health, that the United States marine hospital service be requested to extend the order recommended by the Louisiana State health authorities in reference to precautions necessary to guard against the introduction of yellow fever and small-pox by soldiers and other persons passing to and fro from Cuba, Puerto Rico and other islands of the West Indies to the United States, providing that all baggage and other effects of such soldiers or persons be fumigated and disinfected, regardless of destination."

VERMONT.—Rutland, April 28: At the meeting of the State Board of Health here to-day it was decided to hold a school of instruction at the State laboratory at Burlington this year for the boards of health of Vermont. It was not determined when the school of instruction would be held, but it will probably be for a week at some most convenient season. A series of lectures and demonstrations of experiments will be arranged, touching upon all questions of vital importance to public health. Demonstrations of the use of disinfectants and examinations of infectious diseases will be made. The importance of the public laboratory, schoolhouse sanitation, water supplies, drainage of farms and other kindred topics will be treated. The school of instruction will be free to all members of health boards.

WASHINGTON.—Seattle, 75,000, March, '99: Total deaths, 60; under 5 years, 8; annual death rate per 1,000, 96; from typhoid fever, 2; phthisis, 4; acute respiratory diseases, 11.

WISCONSIN.—Milwaukee, 280,000, March, '99: Total deaths, 319; under 5 years, 113; annual death rate per 1,000, 13.4; from typhoid fever, 2; diphtheria, 12; phthisis, 43; acute respiratory diseases, 49.

SMALLPOX continues more or less prevalent throughout the country, and in some communities where vaccination has been al-

most wholly neglected it is epidemic. Summed up from Public Health Reports of the Marine Hospital Service to May 5, since December 31, the number of cases and deaths in the States severally have been as follows: Alabama, 134, 2; Arkansas, 8, 1; California, 93, 15; Colorado, 136, 9; Connecticut, 2, 0;; District of Columbia, 82, 0; Florida, 200, 0; Georgia, 314, 0; Illinois, 44, 0; Indiana, 68, 1; Indian Territory, 45 deaths; Iowa, 13, 2; Kansas, 56, 7; Louisiana, 192, 2; Maine, 165, 0; Maryland, 19, 0; Massachusetts, 8, 0; Michigan, 22, 1; Minnesota, 21, 0; Mississippi, 23, 3; Missouri, 90, 17; Montana, 2, 0; Nebraska, 372, 3; New Jersey, 6, 0; New York, 25, 4; North Carolina, 85, 1; Ohio, 758, 13; Oklahoma, 37, 13; Pennsylvania, 219, 0; Rhode Island, 3, 0; South Carolina, 126, 10; Tennessee, 123, 0; Texas, 866, 143; Virginia, 1978, 16; Washington, 5, 0; Wisconsin, 22, 2; Wyoming, 6, 0; Porto Rico, 454, 0.

THE HEALTH OF MANILA.

A refutation of the statements in general circulation regarding the health of Manila is furnished by O. F. Williams, former United State Consul at that place, in a report to the Consular Bureau. One statement made by Mr. Williams removes an erroneous belief regarding the rainy season. There is no protracted rainy season. The rainfall is about ten feet per annum and is quite evenly distributed, so that the streets are cleansed and the sewers flushed almost every day. The hot weather hastens decay of all refuse, and it is all the more easily washed from the streets into the sewers and removed by the frequent rains from January to January. The sewers of Manila are not as good as they might be, because of the low level of the city. The water supply is exceptionally abundant, pure and agreeable to the taste. Being within the tropics, the invigorating and beneficial effects of frost are, of course, lacking. The best refutation is Mr. Williams' statement: "I have not been sick a minute since I left the United States in 1897." Manila may not be as salubrious as Old Point Comfort, but Mr. Williams' report will relieve the friends of the soldier boys in the Philippines of no little anxiety as to their health during the summer. Much of the sickness among the soldiers in Cuba and State camps was due to the impure water given them to drink. There is no such source of sickness in Manila.

MORTALITY STATISTICS ABROAD FOR THE FIRST QUARTER 1899.—Population; total mortality; annual death rate per 1,000:

deaths from measles; scarlatina; typhoid fever; diphtheria; pneumonia; phthisis:

London, 4,746,752; 24,286; 19.4; 386; 96; 158; 493; 6,227; 2,287. Glasgow, 733,903; 4,662; 25.2; 81; 54; 38; 50; 1,410; (?). Liverpool, 634,212; 4,171; 26.3; 26; 43; 33; 65; (?); (?). Birmingham, 514,956; 2,547; 19.6; 37; 14; 31; 34; (?); (?). Leeds, 423,889; 2,148; 20.4; 35; 16; 16; 82; (?); (?). Sheffield, 361,-169; 1,814; 20.1; 5; 26; 40; 83; (?); (?). Dublin, 349,594; 2,549; 28.8; (?); 15; 39; 26; 591; 327. Bristol, 320,911; 1,469; 18.4; 8; 2; 9; 10; (?); (?). Belfast, 304,610; 2,125; 27.6; 47; 7; 45; 27; 570; 292. Edinburgh, 298,927; 1,768; 23.7; 47; 19; 10; 25; 381; 174. Nottingham, 239,304; 1,181; 19.8; 44; 11; 15; 11; (?); (?). Bradford, 236,241; 1,133; 19.3; 7; 15; 15; 7; (?); (?). Hull, 234,270; 1,007; 17.4; 13; 6; 3; 14; (?); (?). Newcastle, 228,625; 1,170; 20.8; 21; 5; 3; 5; (?); (?). Salford, 218,244; 1,230; 22.6; 37; 15; 13; 19; (?); (?). Leicester, 213,-851; 854; 16.5; (?); 7; 4; 42; (?); (?). Portsmouth, 190,741; 838; 17.8; 15; 9; 12; 33; (?); (?). Cardiff, 185,826; 770; 17.2; 2; (?); (?); 19; (?); (?). Brighton, 123,226; 525; 17.1; (?); 4; 3; 13; (?); (?). Norwich, 113,266; 525; 18.7; 4; 7; 2; 11; (?); (?). Plymouth, 100,637; 517; 20.7; 1; 1; 2; 4; (?); (?). Amsterdam, 515,027; 2,062; 16.1; 10; 2; 11; 23; (?); (?). Rotterdam, 309,307; 1,487; 19.9; 5; 5; 23; 28; (?); (?). Hague, 199,285; 876; 17.9; 25; 2; 2; 5; (?); (?). Paris, 2,511,629; 13,953; 20.9; 212; 49; 125; 111; 2,263; 2,582. Lyon, 466,028; 2,513; 21.4; 2; 10; 18; 11; 601; 386. Bordeaux, 256,906; 1,417; 22.0; (?); 1; 13; 11; 192; 142. Lille, 222,779; 1,259; 22.8; 1; (?); 10; 14; 213; 191. Saint-Etienne, 135,784; 830; 24.4; (?); 4; 4; 7; 201; 116. Roubaix, 124,447; 561; 18.0; (?); (?); 6; 4; 125; 84. Havre, 119,470; 1,005; 33.7; 37; (?); 25; 2; 171; 167. Rouen, 114,817; 940; 32.7; 27; 3; 7; 7; 176; 137. Nice, 114,121; 666; 23.3; 1; 1; 9; 5; 170; 77. Reims, 107,709; 580; 21.5; (?); 1; 5; 3; 77; 83. Nancy, 99,012; 626; 25.3; 23; 2; 20; 5; 105; 78. Besançon, 58,010; 314; 21.6; (?); (?); 1; 5; 61; 38. Dunkerque, 39,718; 196; 19.7; (?); (?); 2; (?); 30; 28. Pau, 33,072; 175; 21.2; 8; (?); 2; 2; 18; 24. Berlin, 1,747,903; 8,090; 18.6; 78; 130; 14; 188; 1,051; 1,138. Hamburg, 675,351; 2,922; 17.2; 2; 3; 2; 28; 449; 398. Munich, 444,000; 2,576; 23.7; (?); 2; 2; 33; 341; 370. Leipzig, 430,765; 1,981; 18.6; 16; 11; 5; 30; 289; 285. Breslau, 406,461; 2,655; 26.8; 4; 27; 5; 29; 430; 372. Dresden, 389,300; 1,962; 20.6; 6; 6; 4; 33; 289; 248;

Cologne, 353,000; 1,909; 21.5; 15; 1; 5; 44; 235; 233. Frankfort-on-the-Main, 250,932; 1,057; 17.1; 2; 4; 2; 20; 179; 158. Hanover, 234,676; 913; 15.9; 6; 2; 4; 23; 160; 123. Magdeburg, 223,460; 1,077; 19.4; 5; 37; 1; 45; 184; 103. Dusseldorf, 198,787; 925; 19.0; 1; 17; 2; 15; 168; 137. Kœnigsberg, 172,941; 1,081; 24.1; 2; 3; 15; 12; 213; 113. Nuremberg, 181,047; 1,357; 31.2; 2; 6; 2; 13; 254; 229. Chemnitz, 176,900; 1,143; 26.4; 5; 7; 4; 18; 97; 121. Charlottenburg, 172,166; 623; 15.4; 4; 8; 3; 14; 119; 64. Stettin, 159,132; 771; 19.9; (?); 4; 1; 14; 88; 93. Stuttgart, 153,165; 632; 16.8; 1; 3; 1; 8; 105; 57. Brème, 149,544; 686; 18.5; 2; 1; 1; 1; 132; 104. Elberfeld, 149,969; 688; 18.7; 30; 3; 4; 10; 141; 71. Strasburg, 145,307; 760; 21.2; 1; 2; 6; 23; 149; 90. Barmen, 134,768; 606; 18.2; 16; 8; 5; 4; 147; 90. Aix-la-Chapelle, 132,870; 667; 20.2; (?); 1; 5; 8; 143; 78. Dantzig, 129,378; 704; 21.9; 2; (?); 5; 14; 81; 64. Halle, 126,736; 765; 24.6; 8; 48; 5; 29; 127; 57. Brunswick, 125,536; 398; 19.4; (?); 3; 1; 14; 147; 82. Crefeld, 108,585; 468; 17.2; (?); 1; 2; 14; 97; 68. Essen, 109,012; 594; 22.4; 1; 19; 9; 5; 205; 66. Mayence, 78,759; 396; 20.3; (?); (?); 1; 4; 97; 64. Berne, 55,472; 271; 19.1; (?); (?); 2; 6; 40; 46. Bâle, 101,724; 396; 16.7; 6; (?); 2; 7; 60; 57. Genève, 90,708, 523; 23.7; 22; 1; (?); 4; 47; 70. Lausanne, 44,266; 216; 20.7; 52; (?); (?); 3; 19; 25. Zurich, 161,726; 560; 13.9; (?); 1; (?); 14; 81; 76. Chaux-de-Fonds, 32,554; 131; 16.8; 1; (?); 1; 1; 14; 12. Vienna, 1,606,629; 9,277; 23.2; 173; 69; 18; 187; 1,947; 1,688. Buda-Pesth, 666,722; 4,513; 26.6; 85; 42; 83; 74; 992; 866. Prague, 380,497; 2,217; 23.3; 81; 27; 20; 44; 312; 396. Cracow, 83,730; 856; 40.8; 38; 11; 17; 13; 205; 171. Copenhagen, 345,000; 1,890; 20.0; 75; 38; 10; 44; 289; 215. Stockholm, 283,550; 1,726; 24.3; 64; 7; 3; 109; 436; 217. Gothemburg, 123,500; 537; 17.4; (?); 11; 1; 2; 45; 112. Christiania, 217,774; 1,068; 21.0; 2; 5; 3; 10; 200; 178. St. Petersburg, 1,193,817; 8,839; 30.9; 99; 120; 289; 251; 332; 1,187. Moscow, 988,614; 6,693; 26.8; 169; 104; 64; 151; 234; 980. Odessa, 400,600; 1,968; 19.7; 20; 11; 18; 29; (?); 309. Rome, 499,450; 2,621; 20.7; 3; 1; 29; 17; 710; 221. Venice, 169,883; 1,193; 28.5; 68; 1; 6; 41; 286; 105. Bilbao, 74,767; 715; 42.6; 39; 1; 22; 11; 185; 84. Jassy, 70,065; 601; 33.6; 1; (?); 6; 1; 70; 53. Lisbon, 346,992; 2,125; 24.5; 16; 2; 20; 13; 353; 275.

For the fourth quarter, 1898: Utrecht, 98,434; 440; 17.9: 8; (?); 4; 1; 97; 33. Groeningue, 63,863; 286; 17.9; (?); (?); 2; (?); 16.46. Maestricht, 34,125; 182; 21.3; (?); (?); 2; 6;

113; 80. Naples, 551,443; 3,206; 23.0; 2; 3; 17; 6; 623; 298. Milan, 464,819; 1,929; 16.6; 16; (?); 90; 31; 366; 197. Florence, 196,865; 866; 19.6; (?); (?); 30; 6; 73; 113. Bologna, 152,042; 903; 23.7; 21; (?); 30; 5; 93; 47. Brescia, 70,737; 421; 23.8; (?); 3; 14; 8; 94; (?). Madrid, 491,595; 3,781; 29.7; 36; 25; 52; 32; 1,084; 415. Lisbon, 338,587; 2,235; 26.4; 8; (?); 32; 17; 245; 309. Oporto, 171,467; 1,037; 24.2; (?); (?); 32; 26; 97; 117. Bucharest, 248,509; 1,738; 27.9; 37; 51; 47; 88; 282; 185. Cairo, 534,677; 4,368; 32.7; 94; (?); 139; 97; 828; 293. Alexandria, 273,653; 2,236; 32.6; 2; (?); 35; 12; 446; 139. Damiette, 31,285; 173; 22.0; (?); (?); 3; (?); 32; 5. Suez et Ismailia, 19,526; 128; 26.1; (?); (?); 1; 2; 23; 10. Port-Said, 30,773; 168; 21.7; (?); (?); 2; (?); 38; 11.

BUENOS AIRES, Argentine.—771,164, February, 1899: Total deaths, 1,011—457 under 5 years of age. Deaths from typhoid fever, 15; diphtheria, 18; consumption, 71; acute respiratory diseases, 135.

ALCOHOL AND THE RUSSIAN DEATH-RATE.

An official inquiry into the comparatively larger increase in the Tartar population of the city government of Kazan has, according to the Kamsko Volshki Krai, brought out some remarkable facts as to the effect of alcoholic indulgence on the death-rate. The Kazan Tartars, numbering about 640,000, have a death-rate of only 21 per 1,000, while the mortality among the Russians is 40 per 1,000. The general conditions among orthodox Russians and Mohammedan Tartars are practically the same, except in so far as personal habits are concerned. Medical investigation leaves no room for doubt that the lesser mortality of the Mohammedan Tartars is directly due to their abstinence from spirituous liquors, in which the Russians indulge freely.

BUBONIC PLAGUE.

Bombay, April 18.—According to statistics gathered regarding the bubonic plague it is established that there have been over 250,000 deaths recorded in India since its beginning. These figures, however, are undoubtedly far below the actual total, as the natives are known to have concealed quite a number of deaths.

Bombay presidency suffered the most, being responsible for

134,000 deaths, without counting those which occurred in the City of Bombay, which, with Kurrachee, were the chief hotbeds of the disease.

The deaths in Bombay presidency are still about 1,000 weekly. With the return of hot weather, the plague, which is now the third epidemic, is again rapidly disappearing. The mortality, which was 250 deaths in the City of Bombay five weeks ago, has now sunk to 100 per day and the government has dropped the rigorous repressive measures which it has been found impossible to maintain indefinitely.

The Madras presidency is fairly free from the plague, its climate and soil, it is supposed, being unfavorable to a spread of the epidemic.

Bengal presidency has suffered to some extent, including Calcutta, but the situation has not been grave and the spread of the plague is now decreasing.

The Haffkine fluid has been very successful.

OBITUARY.

SIR DOUGLAS GALTON, K. C. B., etc., died in London, March 10, 1899. He was an engineer of much celebrity and one of the most distinguished sanitarians in England. He was born in 1823. Educated in Birmingham and at Rugby. More than forty years ago he took exceptions to the scheme proposed by the Metropolitan Board of Works for the disposal of London sewage. He protested that the condition of the Thames would be injuriously affected in the neighborhood of Basking if the sewage were poured into it at that point, and urged the desirability of conducting it lower down to Sea Reach, where it would have been diluted with a larger volume of water. Due attention was not paid to his contention, but it was abundantly justified by subsequent results. He was next engaged in ameliorating the sanitary conditions obtaining in the British Army. The heavy death-rate that prevailed in the Crimea as a result of inattention to sanitary precautions, and the enormous reduction made in it by the comparatively simple methods adopted by the late Sir Robert Rawlinson, were not without their effect on the Government. Captain Galton, as he was then, formed one of the Commission which visited the barracks and military hospitals of Great Britain and Ireland, and, subsequently,

of our stations on the Mediterranean, and the general health of the army was greatly improved as the result of the sanitary measures instituted by him and his fellow Commissioners. The Herbert Hospital at Woolwich was also constructed from his designs. In fact, Sir Douglas was long recognized as the authority on army sanitation, and he did much to improve the sanitary conditions under which the British soldier serves his country.

Coming to a more recent date, Sr Douglas Galton is to be spoken of as recognizing an important advance in the science of sanitation. In 1889 the Massachusetts State Board of Health commenced some valuable experiments to ascertain whether sewage could be disposed of on biological principles. These experiments were continued for some time, and in December, 1895, Sir Douglas Galton read a paper, at a sessional meeting of the Sanitary Institute, showing the lessons to be learned from this investigation. The object he had in view in reading this production was to excite discussion; yet it is obvious that his own mind was as earnest as in former years to secure the adoption of whatever was calculated to benefit the public health. The paper came just at the time when engineers and chemists were beginning to cast doubts as to whether the sewage treatment in vogue in this country was the most efficient. The vast increase in urban populations was also causing anxiety in many quarters, and many districts were seriously considering how to increase the capacity of their works without having to enlarge the area of their operations. Two passages from Sir Douglas Galton's paper are worth recalling. First, the part in which is given the conclusions arrived at by Mr. Hazen, the chemist who carried out the experiments at Massachusetts, and Sir Douglas' own summary of the lessons derived from his visit. Mr. Hazen said:—

"The purification of sewage by intermittent filtration depends upon oxygen and time; all other conditions are secondary. Temperature has only a minor influence; the organisms necessary for purification are sure to establish themselves in a filter before it has been long in use. Imperfect purification for any considerable period can invariably be traced either to a lack of oxygen in the pores of the filter or to the sewage passing so quickly through that there is not sufficient time for the oxidation processes to take place. Any treatment which keeps all particles of sewage distributed over the surface of sand particles in contact with an excess of air for a sufficient time is sure to give up a well-oxidized effluent; and the

power of any material to purify sewage depends almost entirely upon its ability to hold the sewage in contact with the air. It must hold both air and sewage in sufficient amounts."

From the experiments brought under his notice, Sir Douglas concluded: (1) The suspended matters of sewers (sludge) can be mechanically withheld by straining slowly through suitable material. (2) The filth accumulated by this straining material can be destroyed, and the straining medium restored to a clean condition by mere aëration. (3) The successive alternate operations of fouling and cleansing can be carried on indefinitely without renewal of the straining material. (4) The purification obtained by this straining process practically equals that accomplished by chemical precipitation, and is sufficient to admit of discharge into any considerable body of water not used as a source of domestic supply, or for manufacturing purposes requiring great purity. (5) Such filters can be maintained in constant and efficient operation by suitable aëration. (6) The erection of a plant capable of purifying large volumes of sewage upon a relatively small area calls for no costly construction. Repairs and renewals are merely nominal. The attendance required is but slight. There is no outlay for chemicals, etc. The only expense of mechanical operation is the driving of the blower or air compressor. (7) The process admits of wide variation in the selection of filtering material, and nearly every community can find, in its local resources, something suitable for the purpose.

As an adviser Sir Douglas Galton was in great request, and was connected with many undertakings affecting the drainage and health of cities and towns. In 1870 he accepted the office of general secretary of the British Association, and was long one of its most prominent members. He was president in 1895, and his address was a comprehensive review of scientific progress of the century. Sir Douglas was elected a Fellow of the Royal Society in 1863. He was a vice-president of the Institution of Mechanical Engineers, a member of the Council of University College, honorary member of the Institution of Civil Engineers, a vice-president of the Sanitary Institute, a nominated member of the Metropolitan Asylums Board, and a member of the Linnean, Chemical, Geological and Geographical Societies and the Athenæum Club. Oxford conferred on Sir Douglas, who had been knighted in 1887, its honorary D. C. L. degree, and Durham its LL. D. In none of these societies did he take a greater interest than in the work of the Sanitary Institute. From its very incep-

tion he was one of its warmest supporters, and most regular in his attendance at the sessional meetings and annual congresses. From these his presence will be greatly missed.

Sir Douglas married, in 1857, Marianne, daughter of Mr. G. T. Nicholson, and divided his time between his Droitwich home, Himbleton Manor, and his London residence in Chester street. An indefatigable writer and worker, he had little time for social pleasures. He was a wonderfully attractive conversationalist on any of his special subjects, and his zeal in investigation survived to the last.

The late Sir Douglas Galton had a high opinion of the influence exercised by the pulpit in respect of sanitary matters, and thought that it was desirable to have set sermons preached on such subjects as "Consumption and how to prevent it." But for the fatal termination of his illness he would have presided at the forthcoming annual meeting of the Church Sanitary Association at the Church House, Westminster.

DR. ROBERT RUTHERFORD, State Health Officer under Ross' administration four years (1886-1889), died at his home in Houston March 31, 1899. He was one of the widest known, and deservedly, most popular members of the Texas medical profession. He was a man of fine social qualities, and had hosts of attached friends all over the South. Dr. Rutherford had long been identified with the quarantine service of the State, and is credited with being the author of the first law enacted by Texas for State protection against invasion by epidemic diseases. He was for a long time Health Officer of Houston and of Harris county. He was one of the organizers of the State Medical Association, and was a member of that body continuously to the day of his death, having been honored by the association in many ways. He was made first vice-president at the Houston meeting (1885), and at the subsequent meeting at Dallas (1886) he was in the chair a large part of the session. Dr. Rutherford also served four years on the judicial council, and was sent as delegate to the National Medical Association to represent the State Association. He was a loyal friend and a most pleasant, genial companion. Those who knew him best loved him most, and any one could approach him with the assurance of a courteous reception; a uniform politeness and courtesy characterized him. Peace to his ashes. Dr. Rutherford lost his wife only about a year ago. He left no children.

BOOK REVIEWS.

SANITARY ENGINEERING: A PRACTICAL TREATISE ON THE COLLECTION, REMOVAL AND FINAL DISPOSAL OF SEWAGE; AND THE DESIGN AND CONSTRUCTION OF WORKS OF DRAINAGE AND SEWAGE, WITH SPECIAL REFERENCE TO THE DISPOSAL OF HOUSE REFUSE AND SEWAGE SLUDGE; AND NUMEROUS HYDRAULIC TABLES, FORMULAE AND MEMORANDA, INCLUDING AN EXTENSIVE SERIES OF TABLES OF VELOCITY AND DISCHARGE OF PIPES AND SEWERS, SPECIALLY COMPUTED BY GUANGUILLET AND KUTTER'S FORMULA. By Col. R. C. S. MOORE, R. E., Author of "Sanitary Engineering Notes," etc.; formerly Instructor in Estimating and Construction at the School of Military Engineering, Chatham. 8vo. Pp. 650, with 534 illustrations and 70 large folding plates. Price $10.00. New York: Longmans, Green & Co. London: B. T. Batsford.

The elaborateness of this title page is abundantly justified by the contents of the work. It is the most comprehensive work on sanitary engineering hitherto published. Many works there are that partially treat of it—deal with one or more of its branches—but this alone, so far as our observation extends, deals with the whole subject. There is here brought together in a concise and practical manner the needful knowledge for the guidance of all who would engage in the important work of arranging and constructing schemes for efficient municipal sanitation, and the sanitation of country towns and villages, whether as municipal authorities, engineers, surveyors, executive sanitary officers or sanitary inspectors—a manual on an elaborate scale for every one who is charged with the momentous duty of safeguarding and maintaining the public health. The various plans or methods of sanitary work, whether with reference to house drainage, subsoil drainage, sewage purification and disposal, refuse destruction, etc., are differentiated and represented by cuts, drawings and charts. The velocity of liquids in pipes and channels, lucid examples of methods of making various calculations, hydraulic and other labor saving data and tables are comprehended with a masterful directness of purpose to sanitary economy, as a potent factor in the promotion of sanitary work; for which, indeed, the book is altogether admirably calculated, and it is difficult to conceive how any one con-

cerned in the promotion of sanitary works, or in the exercise of any function thereunto pertaining, can afford to do without it.

THE INTERNATIONAL MEDICAL ANNUAL, 1899: A work of reference for medical practitioners (alphabetically arranged). Combines the features of an annual retrospect with those of a medical encyclopædia. Copiously illustrated with elegant plates, in colors and black and white. Seventeenth year. 8vo. Cloth, pp. 758. Price, $3 net, post or express paid. E. B. Treat & Co., 241-243 West 23d street, New York.

Few medical annuals so thoroughly comprehend all that is useful, to the exclusion of that which is useless material in summarizing the actual progress made in medicine annually as this. Besides the collective gist of the whole field of medical science for the time specified, it is the work of chosen specialists in the several departments of medicine, comprehending the results of scientific investigation in the departments severally. Among the representative essays, respectively, in this volume are the following: "Practical X-Ray Work," by R. Norris Wolfenden, M. D., B. A.; "Advances in Skull Surgery," by Seneca D. Powell, M. D.; "Surgical Treatment of Paralysis," by Drs. Robert Jones, F. R. C. S., and A. H. Tubby, M. S., M. B. These articles will be freely illustrated, chiefly by reproductions from photographs. An excellent article on "Climatic Treatment of Consumption," by F. de Havilland Hall, M. D., F. R. C. P., as well as one on "Legal Decisions Affecting Medical Men," by Wm. A. Purrington, A. B., LL. M., will be found interesting and pertinent. In response to the request of many of our subscribers there will be found an article on "The Chief Pathogenic Bacteria in the Human Subject," with descriptions of their morphology and methods of microscopical examination, by S. G. Shattock, F. R. C. S., the Pathological Curator of the Museum of the Royal College of Surgeons, London, illustrated by a series of finely colored plates. Sanitation: The Year's Work in Sanitary Science, with Particulars of Recent Improvements in Sanitary Appliances (illustrated), by Joseph Priestley, B. A., M. D., D. P. H., Medical Officer of Health for Parish of Lambeth, London.

As a work of reference, there is scarcely a subject to be thought of that may not be found in the "Annual," and not the least of its excellences is a copious index. No work that we are acquainted with offers so much at so small a price.

SAJOUS' ANNUAL: ANNUAL AND ANALYTICAL CYCLOPAEDIA OF PRACTICAL MEDICINE, by CHARLES E. DE M. SAJOUS, M. D., and one hundred associate editors, assisted by corresponding editors, collaborators and correspondents. Illustrated with chromolithographic engravings and maps. Vol. III. 1899. Royal octavo, two columns to the page. Pp. 600. Philadelphia, New York and Chicago: The F. A. Davis Company.

This volume carries the vocabulary from Dislocations to Infantile Myxœdema. Among the many important articles worthy of particular mention are: "Dislocations," by Drs. Lewis A. Stimson and Edward L. Keyes, Jr., New York; "Dysentery," by Dr. Simon Flexner, M. D., Baltimore; "Empyema," by Drs. J. McFadden, Gaston, and J. McFadden, Jr., of Atlanta; "Epilepsy," by Dr. Wm. Broaddus Prichard, New York; "Fatty Degeneration of the Heart," by Dr. James M. Auders, Philadelphia; "Formaldehyde," by Dr. C. Sumner-Witherstine, Philadelphia; "Fractures," by Drs. Lewis A. Stimson and Edward L. Keyes, Jr., New York; "Hernia," by Wm. B. Coley, New York; "Hip Joint Disease," by Dr. Reginald H. Sayre, New York; "Hypertrophy of the Heart," by Dr. Herman F. Vickery, Boston; "Hypnotism," by J. T. Eskridge, Denver; "Infantile Myxœdema," by William Osler, Baltimore, and Rupert Norton, Washington.

The work throughout maintains its excellence in an eminent degree, as we have before had occasion to notice. Altogether it is unquestionably one of the most fruitful and indispensable of medical reference books.

THE SMITHSONIAN INSTITUTION: Annual Report of the Board of Regents, Showing the Operations, Expenditures and Condition of the Institution to July. 1897. 8vo. Pp. 733. Washington: Government Printing Office.

Besides the detail of the report in accordance with this title, showing the Institution to be in a most satisfactory condition, the "General Appendix" comprehends some thirty reports of investigations of scientific subjects by collaborators of the Institution, and memoirs of general character or on special topics of more or less interest or value to scientific readers of every class. Several of these are appropriately illustrated with plates and charts; as is also the National Zoological Park in the secretary's report, and the building for the Library of Congress, in detail.

BUFFALO SANITARY CLUB PROCEEDINGS: A pamphlet of thirty-seven pages, comprehending an interesting discussion of "Hygienic Camps," by Prof. Henry R. Hopkins; "Camps of Instruction," by Peter C. Harris, First Lieutenant and Quartermaster 13th Infantry, U. S. Army; "Camp Sewers," by Major C. E. P. Babcock, 65th N. Y. V., Buffalo; "Disposal of Refuse, Garbage and Sewage in Camps of Instruction," by Edward Clark, M. D., of Buffalo; "Water Supply," by Louis H. Knapp, Superintendent and Engineer, Buffalo City Water Works; and "The Relative Importance of Flies and Water Supply in Spreading Disease," by M. A. Veeder, M. D., of Lyons, N. Y.

CONTEMPORARY LITERATURE.

SUMMER SCHOOLS.

The discontinuance during the last year or two of certain summer schools that were once well patronized may have led to the inference that the summer-school movement in this country is on the decline. While it may possibly be true that the total number of summer schools holding sessions in 1899 will be somewhat less than the number of such institutions, say, three or four years ago, it should not be inferred from this that the actual amount of scholastic work done during the summer months in this country has suffered a decrease. On the contrary, it is probably true that a larger number of teachers and students will be occupied in such work during the coming summer than at any previous time in our history. The fact is that summer work has been more effectively organized all along the line. Colleges and universities which a few years ago were practically closed for nearly or quite three months of the year are now throwing open a considerable part of their equipment for the use of summer students. There is a marked tendency, East and West, to dignify this summer work of the universities and colleges—if not altogether to follow the example of the University of Chicago in making the summer quarter equivalent with any other three months of the calendar year in courses offered. Meanwhile the long-established summer schools for the special training of teachers and the "asemblies" for biblical study have added to their facilities, and are now stronger than ever be-

fore in point of teaching faculties and bodies of students.—From "Conventions and Other Gatherings," in the "American Monthly Review of Reviews" for May.

A BOON TO BUSY PEOPLE.

Pentoscopic or bifocal glasses have become quite popular recently on account of great improvements effected in their manufacture, and are being found useful by persons who need different focal powers for reading and for distant vision. The original form of bifocal glasses, which consists of two half lenses, the one for distance above and that for reading below, was first made at the suggestion of Benjamin Franklin, who was slightly short-sighted and therefore needed concave glasses for distance; but as he grew older convex glasses were also needed to read with, so that he found a combination of two different glasses in one frame a great advantage in many ways. Some time afterward a questionable improvement was made by grinding the two required curves, one on the upper half and the other on the lower half of the same lens. Within the past few years, however, a decidedly advantageous change has been made, which consists of a thin film of crystal cemented to the inner surface of the distance lens toward the lower edge. Through this small segment the wearer is able to read and write with comfort and still have the greater part of the distance lens for general use.—John S. Stewart, in May "Lippincott's."

THE ALEXANDRIAN LIBRARY.

Mr. E. H. House, in "Bright Sides of History," in ST. NICHOLAS for May, tells of the destruction of the great library at Alexandria by the fanatic Calif Omar. The great library of Paris is the largest now, but the collection once amassed at Alexandria would have made the French Biblothèque look small—in bulk, at any rate. Omar, a fanatical calif who overran Egypt about the middle of the seventh century, proclaimed that, since the Koran contained everything that human beings ought to read, no other books had any right to exist; so he condemned to destruction the immense library founded by the Ptolemies and constantly enlarged by their successors until the advent of the Saracens. How enormous it was you can imagine from the fact that for six months the manuscripts supplied the fuel of four thousand public baths. It was the most terrible

blow ever inflicted upon literature, though a good many barbarities of the same kind have been perpetrated, and not by Mohammedans alone.

ANDREW LANG'S MEMORY.

It now appears that a certain clever quatrain on Poe, which Mr. Andrew Lang attributed to Mr. Austin Dobson, was really written by Mr. Lang and promptly forgotten by him. Mr. Lang has, of course, made the amende honorable, but the incident is rendered none the less interesting. Readers who rely on eminent critics for "critical insight," says *Literature,* are beginning to wonder where Mr. Lang's reputation for "critical insight" is left, if by internal evidence, aided by unconscious knowledge, he was unable to ascertain the authorship of the quatrain before committing himself. One would think that Mr. Lang could by this time differentiate himself and Mr. Dobson, particularly in the matter of quatrains.

TEDDY'S TUTOR: THOMAS TINKLER.

Thomas Tinkler, Teddy's tutor,
  Tried to teach Ted tactfully;
Trifling Teddy thought too tiresome
  Tutor Tinkler's tendency.

Therefore Teddy, tempting trouble,
  Tried to thwart the tutor's tact;
Turned to taking truant trudges,
  Till T. Tinkler Teddy tracked.

Tutor threatened, truant trembled,
  Then to tardy tasks turned they.
Thanks to tutelary tyrant,
  Teddy's talents tell to-day.

—Harper's Round Table.

HOW BACHELOR GIRLS LIVE.

In two apartments, each six rooms and bath, seven or eight girls, by some planning and ingenuity, may be comfortably housed and fed. The front and back parlors in each apartment, shared by two

girls, become sitting-room and bedroom, or two sitting-rooms, as their occupants prefer. In many New York apartments the other four rooms would be the dining-room, a bedroom off, another small bedroom for a maid beyond, and a kitchen at the back of the house. With this arrangement one girl could occupy the bedroom off the dining-room, another the smaller room, if there should be no maid or if the maid should sleep at home. Even with housekeeping it is possible to make the dining-room between meals into a sitting-room for these two girls, by some devices to be described later. In the second apartment, where there is no cooking, the dining-room may be made to lose its identity completely, and the kitchen be transformed into a store-room, bedroom or study, as the case may require.—Harper's Bazar.

The NORTH AMERICAN REVIEW for May assumes new management under the editorial direction of Mr. George B. M. Harvey. The size has been enlarged, and its appearance improved. And this first number under the new management has a particularly attractive table of contents. The first article is the opening one of a promised series from the pen of Major-General Nelson A. Miles, Commanding the United States Army, on "The War with Spain." Rear-Admiral Lord Charles Beresford, R. N., contributes a paper on "China and the Powers," while "The Religious Situation in England" is described by the Rev. John Watson, D. D. (Ian Maclaren). The Hon. T. B. Reed, Speaker of the House of Representatives, writes attractively concerning "The Nicaragua Canal," and Nicolas Estevanez, formerly Minister of War of Spain, discusses "What Spain Can Teach America." Colonel Charles Chaille Long, formerly Chief of Staff to General Gordon, treats of "England in Egypt and the Soudan," and a charming essay on "The New Poetry" is furnished by William Dean Howells. An exceedingly timely article is that on "The Existing Conditions and Needs in Cuba," by Major-General Leonard Wood, Military Governor of the Province of Santiago. "Courts-Martial in England and America" are ably considered by the Rt. Hon. Sir Francis H. Jeune, Judge Advocate-General of the British Army, and "The Curse in Education" is earnestly dealt with by Rebecca Harding Davis. The "Work of the Joint High Commission" is favorably viewed from an authoritative standpoint by a writer who signs himself "A Canadian Liberal." Under the caption of "Wireless Telegraphy," two most important articles are furnished, viz.,

one by G. Marconi, who treats the subject in "Its Origin and Development," and the other by J. W. Fleming, F. R. S., upon "Its Scientific History and Future Uses."

The feature of HARPER'S WEEKLY for the last few months has been a complete and thorough discussion of "Our New Possessions" and the opportunities they offer for American industrial enterprise. Franklin Matthews and William Dinwiddie, in their special letters to the Weekly, have given all needful information about Cuba and Puerto Rico. Now begins the long-expected series of articles on Hawaii, by Caspar Whitney. Mr. Whitney, on his recent journey around the world, made a thorough study of the people, climate, natural resources, and the commercial possibilities of the Hawaiian Islands. It goes without saying that the articles will be valuable, and they should be read by all Americans who are interested in the first of our new colonies.

THE CENTURY'S plans for the treatment of the Spanish War culminate with the publication in the May number of a remarkable series of papers in which the commander of every American vessel but one describes his share in the battle off Santiago, which resulted in the complete destruction of Cervera's fleet. The only exception is in the case of the Oregon, whose commander, Capt. Clark, endorses Lieut. Eberle's account of that ship's participation in the fight, and himself contributes a criticism of the Spanish Admiral's strategy. "The Story of the Captains" is written with remarkable animation and in wholly untechnical language. "Fighting Bob" Evans of the Iowa, Lieut.-Commander Wainwright of the Gloucester, and in fact all the commanders in this famous fight, which has been well characterized as a "captains' battle," can see the strong points of a story of adventure as plainly as the weak points of an enemy's ship; whether they bring them out with the skill of trained writers or not, is a question each reader will answer for himself. It may safely be said that no battle by land or sea has ever been so completely and authoritatively described, in any one periodical, as the fight off Santiago is presented in this group of lavishly illustrated articles. "The Story of the Captains" fills about seventy pages, but the magazine has been enlarged to make room for it without crowding other matter, of which there is an entertaining variety as usual.

HARPER'S MAGAZINE for May contains Part IV. of the history of "The Spanish-American War," by Henry Cabot Lodge, illustrated by Thulstrup, Zogbaum, Chapman and Christy; "The Civil Service and Colonization," by Francis Newton Thorpe; "Catherine Carr," a story, by Mary E. Wilkins; "Our War Correspondents in Cuba and Puerto Rico," by Richard Harding Davis; "A Sketch by MacNeil," by Frederic Remington, illustrated by the author; "Keeping House in London," by Julian Ralph, illustrated by A. E. Sterner; Part V. of "Their Silver Wedding Journey," illustrated by W. T. Smedley; Part II. of "The Princess Xenia," by H. B. Marriott Watson, illustrated by T. de Thulstrup; "The Birth of the American Army," by Horace Kephart, illustrated by Frederic Remington; and three short stories by Ellen Glasgow, Ruth McEnery Stuart and Henry M. Blossom, Jr. In an article entitled "The Berth of the American Army," Mr. Kephart shows the part which the backwoodsmen played in the making of the nation. He shows that the first American soldiers were backwoodsmen of the "Leatherstocking" type, and tells how the frantiersmen were trained to shoot, describes them in camp and in action, with many interesting anecdotes of marksmanship.

The Century will issue three special numbers: June, "Out-of-Doors Number;" July, "The Story-Tellers' Number;" and August, "Midsummer and Travel Number." An article by Henry Van Dyke on "Fisherman's Luck," and a dozen striking pictures of Niagara Falls by the artist, Castaigne, are two of the features of the June issue.

THE JEFFERSONIAN, Vol. I., No. I., April, is an animating promise for the tenth day of each month during the college year, by the undergraduates of the Jefferson Medical College, Philadelphia. It urges the *Jeffersonian Spirit* upon the alumni of the institution to a more lively remembrance of the great man, the traditions, splendid and epoch-making achievements of the old Jefferson in conjunction with the magnificent equipments of the new, which should inspire enthusiasm and collegiate patriotism in trustee, professor, alumni and student. "Then Jefferson spirit will be a great reality, exercising widespread influence upon present and future generations, and Jefferson College, with all that is new and modern, will live the twentieth century with greater glory than ever before." In the promotion of this purpose the Jeffersonian wishes to ob-

tain a complete list of the alumni of the college and desires information on matters of interest to any of its members.

THE JOURNAL OF TUBERCULOSIS. A quarterly magazine, devoted to the prevention and cure of tuberculosis. Karl Von Ruck, B. S., M. D., editor. April, 1899. Fifty-five pages. One dollar a year. The Journal of Tuberculosis, Asheville, N. C. The editorials of and contributions to this number are all based upon knowledge of the infectiousness of tuberculosis and its treatment from that point of view. A supplement is appended, the first contribution of a promised series by the editor, "Covering the Whole Subject of Pulmonary Tuberculosis." This first article is on the cause of tuberculosis and the conditions which predispose to its acquirement.

THE HUNDRED YEAR CLUB.

This is a recent organization whose aims are to collect and maintain a library to contain everything of value written on the subject, including the theories of India, Egypt and the Ancient Hebrews, as well as more modern ideas.

To concentrate the experience of mature analytical minds, particularly those who have attained excessive longevity, and learn the lessons therefrom, and present it in a manner that will be more acceptable to youth.

To secure the essence of scientific knowledge in plain language, that the wonderful progress being made in this direction may be utilized by the people.

To establish branch "Hundred Year Clubs" to aid in the same purpose, either for the study of special phases of the question or in general.

To hold meetings and publish the proceedings thereof with the more valuable papers read at meetings of the various clubs, and discussions thereon.

To publish in a condensed form the essential points of leading works upon the subject, that our publication may contain a vast amount of valuable information in convenient form not otherwise accessible; in fact, everything of use on the subject, quarterly, or as often as may be.

The purpose of the club is to give the broadest possible latitude to the consideration of *longevity*, and to avoid magnifying any special phase of the question, however meritorious it may be.

There are some special lines of thought, "fads," that have, perhaps, been magnified beyond their real importance. The club will endeavor to get at the points of use and practical value, and indulge in the ideal only as it may have the appearance of becoming practical, and not give offence to any earnest, honest seeker after truth.

The design of the club is social as well as educational. One member from a family entitles the family to the benefits of the club and one copy of papers, proceedings, etc. Small clubs should hold their meetings in the homes of members when larger quarters cannot be filled. Much is expected of the small clubs, and equal attention will be given their good ideas as to the larger clubs.

In order that the club may not be diverted from its general purpose to some side issue, it will be governed by a board of fifteen directors (whose term of office shall be from one to five years, making the term of office of three directors expire each year); with an executive committee appointed by the Board of Directors to manage the details as directed by the board, that its usefulness on this broad foundation may continue.

There are four classes of members—active, corresponding, life and honorary, as follows:

1. Active; annual fee..... $5.00
2. Corresponding; annual fee..... 5.00
3. Life membership..... 100.00
4. Honorary members may be selected from authors of books of special value on the subject of *longevity*, and persons who have lived one hundred years, or others, may be admitted by unanimous consent of the Board of Directors or the Executive Committee.

A contribution of five hundred dollars will constitute the donor one of the founders of the library..... 500.00

G. W. SMITH,
Secretary and Treasurer,
New York Life Insurance Building, New York.

INDEX.

Abbott, S. W., Saving the Children, 39.
Abdomen, Penetrating Wounds of, 530.
Addie, P., Removal of Insanitary Areas and the Management of Improvement Schemes Under the Working Classes, 19.
Adulteration, Food, 481.
Alcoholism in Children, 531.
Animals, Diseases of, in Germany and Italy, 533.
Antitoxin Bill Defeated, 451.
Antitoxin, Diphtheria and, 156.
Appendicitis in the Army, 526.
Arkansas State Board of Health, 87.
Armstrong, S. T., Sanitary Condition and Vital Statistics of Nuevitas and Puerto Principe, 393.
Army, Appendicitis in the, 526.
Army, Deaths in the, 375
Army Sanitation in Argentina, 526.
Army, the U. S., Report of the Surgeon-General of, 253.
Art, Great Works of, Unearthed by Accident, 189.

ASSOCIATIONS, CONFERENCES, ETC.:

American Climatological Association, 478; American Medical Association, 479; Conference of State and Provincial Boards of Health, 479; German Society of Public Hygiene, 538.

Bache, R., Dietaries of the Slums, 105.
Bachelor Girls, How, Live, 561.
Bacteriological Laboratory in Vermont, 179.
Bashore, H. B., Sources of Impurity in Country Houses, 495.
Baths, Boston's Public, 249.
Beds of Various Nations, 168.
Beef, Embalmed, 246.
Bethlehem, What One Sees at, 94.
Birth Rate, the English, 278.
Boobbyer, P., *et al.*, House Drainage and Sewerage, 26.

Book Reviews:

American Monthly Review of Reviews, 287, 384, 470; Annual Addresses of S. C. Busey, 379; Annual and Analytical Cyclopædia of Practical Medicine (Sajous), 186, 558; Century Magazine, 95, 192, 563; Christian Science (Reed), 280; Examination of Water (Mason), 378; Harper's Magazine, 96, 191, 384, 564; Harper's Pictorial History of the War with Spain, 186; Harper's Weekly, 91, 563; International Medical Annual (Treat), 282, 557; Island of Cuba, 477; Jeffersonian, 564; Journal of Tuberculosis, 565; Literature, 91, 287, 561; Littell's Living Age, 192, 476; Massachusetts State Board of Health, Annual Report, 173; Microscopy of Drinking Water (Whipple), 279; Monist, 476; Municipal Functions' (Maltbie), 281; North American Review, 95, 383, 562; Open Court, 476; Phonendoscope, The, (Bianchi), 90; Practical Urinalysis (Purdy), 89; Primer of Psycology (Burr), 89; Principles of Bacteriology (Hueppe), 282; Proceedings of the Conference of State and Provincial Boards of Health, 185; Report of the Commissioner of Education, 281; Sewerage (Folwell), 88; Sexual Instinct (Scott), 183; Smithsonian Institution, 91, 558; Three Thousand Questions on Medical Subjects (Blakiston), 280; Sanitary Engineering (Moore), 556; Sanitary Club of Buffalo, 559.

Broadbent, W., Prevention of Consumption, 193.
Bromidia in Epilepsy, 352.
Bronco-Pneumonia, Gillet, 436.
Bubonic Plague, the, 551.
Building Improvements, Sykes, 13.
Busey, S. C., Sanitation of Washington, D. C., 205.
Buveurs de Petrole, 531.

Campbell, A. W., Influence of Pavements on Public Health, 131.
Camps, Hygienic, Hopkins, 217.
Cancer Microbe, the, 531.
Candy, Adulterated, 451.
Cars, Disinfection of, 536.
Carus, P., Hints on the Treatment of Children, 118.
Centenarians, Five, 445.
Cerebro-Spinal Meningitis, 466.

Chemistry of the Living Body, 472.
Chicago Canal, The, Phillips, 339.
Children, Alcoholism in, 532.
Children, Hints on the Treatment of, Carus, 118.
Children, Saving the, Abbott, 39.
Circoceles, Surgical Treatment of, Schwartz, 349.
Classification of Causes of Death, 467.
Climate and Consumption, 283.
Colitis in Children, Guinon, 70.
Collyria of Iodide of Potash, 351.
Community, A Sensible, 242.
Consumption, Climate and, 283.
Consumption, Convicts and, 447.
Consumption, Prevention of, Broadbent, 193.
Consumption, Restriction of, 446
Consumption, Treatment of, in England, 530.
Consumptives, Government Reservation for the Care of, 446.
Consumptive Poor, The, 198.
Consumptives, Sanatoria for, 277.
Contagious Diseases in Philadelphia, 273.
Convicts and Consumption, 447.
Corbally, T. P., Medical Excerpt, 69, 147, 349, 436, 526.
Cuba, Colonel Waring's Work in, 93.
Cuba, Havana's Needed Sanitation, 162.
Cystitis, Treatment of, Mayfield, 154.

Davidson, A., The Malarial Problem in the Light of Epidemiology, 498.
Dentistry, Proposed Legislation to Regulate, 140.
Diet in Health, 379.
Dietaries of the Slums, Bache, 107.
Diphtheria and Antitoxin, 156.
Diphtheria Bacillus, 244.
Diphtheria Nest, A Typical, 362.
Dirt Is Catching, 536.
Disease, Hunt to Destroy, 230.
Disease, Spread of, by Flies and Gnats, Veeder, 409.
Diuretics, 528.
Drainage, Combined: Its Pros and Cons, Priestley, 32.
Drainage and Sewerage, House, Boobbyer, 26.
Drains, House, Construction and Ventilation of, Hill, 28.
Drummer, A Dangerous, 535.

Dump, A, Wanted, 363.
Dumps, City, and Disease, 242.
Durant Gymnasium, The, 43.
Dwelling Accommodations in Large Cities, Meade, 3.

Education, Science in, 380.
England, Village Life in, Some Conditions of, 37.
Engman, M. F., Infection in the Toilet, 111.
Erysipelas, The Blood in, 439.
Exhibition Stopped, A Cruel, 451.
Express Charges, To Regulate, 88.
Eye-Mindedness and Ear-Mindedness, 188.

Fame, The Flower of, 472.
Filtration, Sand, of Public Water Supplies, Lea, 289.
Fireproofing Warships, Hexamer, 156.
Fires, How to Prevent, 444.
Fish, Alimentary Value of, 285.
Fluegge, C., Disinfection of Dwellings with Formaldehyde, 411.
Flushing Purposes, Domestic, Quantity of Water Required for, Porter, 34.
Food Adulteration, 481.
Food Cans, Poisonous, 363.
Formaldehyde, Disinfection of Dwellings with, Fluegge, 411.
Frankenthal, A. L., Insanity in Switzerland, 433.

Gannett, H., Decadence of the Negro Population in the U. S., 45.
German Red Cross Medal, The, 450.
Germicide, Soap as a, 87.
Glasses, Bifocal—A Boon to Busy People, 560.
Griffin, W. T., Nuts as Food in Foreign Countries, 55.
Gymnasium, The Durant, 43.

Hands, Care of the, 190.
Havana, New Orleans and, 356.
Havana, Sanitation in, Black, 399.
Havana's Good Health, 519.
Hawaii, Typhoid Fever in, 164.
Health, 44.
Health—A Fragment, 204.
Health, Inequality in the Inheritance of, 473.

Health of Boys at School and College, 116.
Health, Public, School of, 537.
Health Resorts of Pennsylvania, 239.
Health Rules, Prize, 534.
Health Service, National, Awaiting Congressional Action, 79.
Heart, Pathology of the, Bouchard, 71.
Hemostatic, A, Hot Air as, Schneider, 70.
Heroes of the Railway, 381.
Hill, A. B., Construction and Ventilation of House Drains, 28.
Hopkins, H. R., Hygienic Camps, 217.
Horse Flesh Market, 246.
Hospital, For a New Floating, 158.
House Drainage and Sewerage, Boobbyer, 26.
Houses, Country, Sources of Impurity in, Bashore, 495.
Housing of the Working Classes, Meade, 3.
Housing of the Working Classes—Removal of Insanitary Areas and the Management of Improvement Schemes Under the Working Classes, Addie, 19.
Hughes, O. J. D., New Method of Preserving Meat, 42.
Hundred Year Club, The, 565.
Hutchins, I. J., Insomnia, 67.
Hydrophobia, 245.
Hygiene, Professor of, at Harvard, 249.
Hygiene, Report of Committee on, Medical Society State of N. Y., 227.

Inebriates, Treatment of Germany's, 156.
Infection in the Toilet, Engman, 111.
Infectious Diseases, 85.
Influenza, 158.
Influenza in New England, Overlook, 157.
Insanity in Switzerland, Frankenthal, 433.
Insanity's Debt to Medical Science, 188.
Insomnia, Hutchins, 67.
Insurance, Health and Accident, Combined, 447.
Insurrection, Cuban, A Résumé of the Last, 286.

Jew, Tenacity of Life in the, 93.
Johnson, J. B., Fruits of Sanitary Science, 385.
Journal of the American Medical Association—The Newly Elected Editor, 352.

Kipling, Reminiscences of, 475.
Kipling's Illness, Interest in, 471.
Koppé, D., Unwholesomeness of Chemically Pure Water, 426.

Lambert, C., Artificial Lighting, 232.
Lawyer, A Prosperous, 220.
Lea, R. S., Sand Filtration of Public Water Supplies, 289.
Lee, B., The Sanitarian, 441.
Leper Home, The Louisiana, 429.
Lepers, Canadian, 522.
Lepers, The, of Molokai, Wheeler, 49.
Library, The Alexandrian, 560.
Life, 435.
Life and Health, 92.
Life, Human, Length of, 445.
Lightning, Artificial, Lambert, 232.
Linsley, C. A., Local Sanitary Administration of a City, 442.
Listerine, 439.
Loomis Sanitarium, The, 240.

Malarial Diseases, German Studies of, Mason, 137.
Malarial Problem, The, in the Light of Epidemiology, Davidson, 498.
Manila, Health and Sanitation at, 449, 548.
Manna of the Bible, Castrey, 155.
Mason, F. H., German Studies of Malarial Disease, 137.
Meade, T. de C., Dwelling Accommodations in Large Cities—Housing of the Working Classes, 3.
Meat Juice, Valentine's, Longmore, 154.
Meat, New Method of Preserving, Hughes, 42.
Medical Excerpt, Corbally, 69, 147, 349, 436, 526.
Medical Press, Bureau of the, 480.
Microbes, 448.
Milk, 483.
Milk, Embalmed, 372.
Morse, W. F., Utilization of City Refuse, 221; Utilization of City Refuse: Disinfection and Sterilization, 343.
Mortality Reports and Reviews, 80, 170, 253, 364, 451, 538.
Mortality Statistics Abroad, 181, 375, 548.
Municipal Authorities and Public Slaughter Houses, Parkes, 97.

Navy, U. S., Health in the, 474.
Negro Population in the U. S., Decadence of, Gannett, 45.
New Orleans and Havana, 356.
New Orleans to be Sewered and Drained, 173.
Newport Board of Health, 241; Abolished, 178.
Non-Committal, 518.
Nuevitas and Puerto Principe, Sanitary Condition and Vital Statistics of, Armstrong, 393.
Nuts as Food in Foreign Countries, Griffin, 55.

OBITUARY:

Sir Douglas Galton, 552; John B. Hamilton, 169; George H. Rohé, 251; Robert Rutherford, 555.

O Blessed Health, 146.
Observation, An Exemplified, 226.
Orthoform, 531.
Otitis, Williams, 438.
Oxygen, Means of Renewing, in Vitiated Air, 447.
Oysters and Typhoid Fever, 350.

Paludism: Laveram, 350.
Parkes, E., Municipal Authorities and Public Slaughter-Houses, 97.
Paste for Removing Blackheads, 440.
Pasteur, Monument to, 448.
Pavements, Influence of, on Public Health, Campbell, 131.

PERSONAL:

C. N. Hewitt, 459; J. F. Hibberd, 87; W. T. Jenkins, 364; F. Montizambert, 364; G. H. Simmons, 353; Rear Admiral Van Reypen, 448.

Pennsylvania Health Resorts, 239.
Pensioner Regrets His Cure, 450.
Philadelphia, The Result of Official Corruption in, 474.
Philadelphia: Wanted—A Man, 402.
Philippine Architecture, 288.
Philippines, The—Climate and Vital Statistics, 165.
Phillips, H., The Chicago Canal, 339.

Pickering, J. S., New Streets and Buildings, 7.
Plague, The, and Its Origin, 402.
Plague, The, at Vienna, 85.
Plague, The, in India, 512, 551.
Plumbing, Bad—Smoke Test Experiences, 337.
Porter, C., Quantity of Water Required for Domestic Flushing Purposes, 34.
Pregnancy, Convulsions During, 529.
Priestley, J., Combined Drainage—Its Pros and Cons, 32.
Prison Improvements, 250.
Protonuclein, 351.
Protonuclein, Sherman, 147.
Puerto Rico, 275.
Puerto Rico, The Climate of, 383.

Quarantine, Effective, 357.

Rabies, Treatment of, by the Board of Health, 451.
Race Problems, Best Solutions of the, 48.
Red Cross, The, in the War, 187.
Refuse, City, Utilization of, Morse, 221, 343.
Rural Districts, Sanitary Defects in, Smith, 36.
Russian Death Rate, Alcohol and the, 551.

Sailors, How, Are Made, 382.
Salicylate of Soda and Antipyrin, Bardin, 440.
Sanatoria for Consumptives, 277.
San Francisco, The Subsidence of the City of, 54.
Sanitarian, The, Lee, 441.
Sanitarium, The Loomis, 240.
Sanitary Administration of a City, Local, Linsley, 442.
Sanitary Authority, 516.
Sanitary Bucket, Scott's, 86.
Sanitary Engineering of Buildings, Gerhard, 468.
Sanitary Improvements, Financial Value of, 524.
Sanitary League, An International, 537.
Sanitary Park, A State, in Minnesota, 160.
Sanitary Progress Not All Abroad, 247.
Sanitary Science, The Fruits of, Johnson, 385.
Sanitation, Army, in Argentina, 526.
Sanitation in Cuba, 162.
Sanitation in Havana, Black, 399.

Sanitation in Ontario, 76.
Sanitation in Washington, Busey, 205.
Sanitation, Perils of, 448.
Sanitation, The Japanese and, 450.
Scholar, An Apt, 405.
School of Public Health, 537.
School Sanitation, Harris, 391.
School Sanitation in Boston, 268.
School System, The Rochester, Needs Revision, 451.
Schooling, 445.
Schools, Summer, 559.
Scotch Weather, 408.
Sewerage and Drainage, House, Boobbyer, 26.
Skene Hospital, 538.
Slaughter-Houses, Public, Municipal Authorities and, Parkes, 97.
Slums, Dietaries of the, Bache, 105.
Smallpox, 180, 265, 270, 358, 547.
Smith, G. H., Sanitary Defects in Rural Districts, 36.
Smoke Nuisance, The, 159.
Smoke Test Experiences, 337.
Soap as a Germicide, 87.
Spanish-American War, The, 284.
Spitting Nuisance, The, 457.
Sport, Pure, Difficulties in the Way of, 189.
Squirrel Inns, 285.
Streets and Buildings, New, Pickering, 7.
Sugar an Article of Nutrition, Chauvaux, 69.
Sweat-Shops, Bill to Improve, 449.
Sykes, J. F. J., Building Improvements, 13.
Sympathy, 467.

Teddy's Tutor, 561.
Telephones, Inspection of, 366.
Temperature, The Best Air, 282.
Tobacco, Test for the Presence of Nicotine in, 521.
Torticolis, 527.
Tree Planting and Fountain Society of Brooklyn, 469.
Tuberculosis in Tenement Houses, 450.
Typhoid Fever, 269.
Typhoid Fever at Army Camps, 513.
Typhoid Fever, Damages for, 449.
Typhoid Fever in Hawaii, 164.

Typhoid Fever, Oysters and, 350.
Typhoid Fever, Some Causes and Conditions Relative to the Spread of, 166.

Uric Acid Diathesis, 529.

Values, 475.
Veeder, A. M., Spread of Diseases by Flies and Gnats, 409.
Village Life in England, Some Conditions of, 37.
Vin Mariani in Exhaustion, 352, 530.

Waring's, Colonel, Work in Cuba, 93.
Washington, A French Tribute to, 286.
Washington, D. C., Sanitation of, Busey, 205.
Water, Chemically Pure, Unwholesomeness of, Koppé, 426.
Water, London, Purity of, 533.
Water Supplies, Public, Sand Filtration of, Lea, 289.
Water Supply, A Filthy, 406.
Water Supply, Obstructing Filtration of, 274.
Waterproofing Paper, New Method of, 525.
Wheeler, E. G., The Lepers of Molokai, 49.
Wheelmen as Benefactors, 129.
Windsor Hotel Fire, 443.
Woolen Quilts and Mattresses, 169.

Yellow Fever, New Quarantine Regulations for the Prevention of, 250.
Yellow Fever, To Keep Out, 85.
Yorkshire Man, Proof of a, 216.

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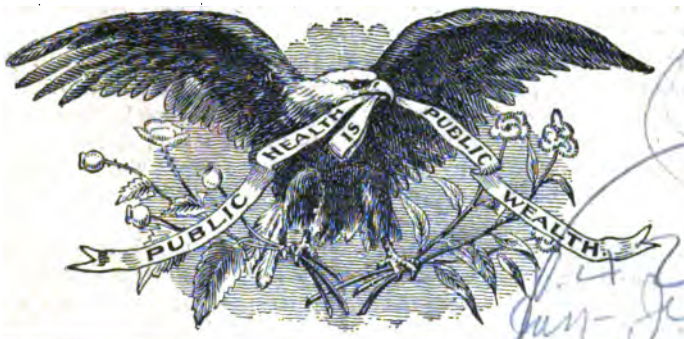

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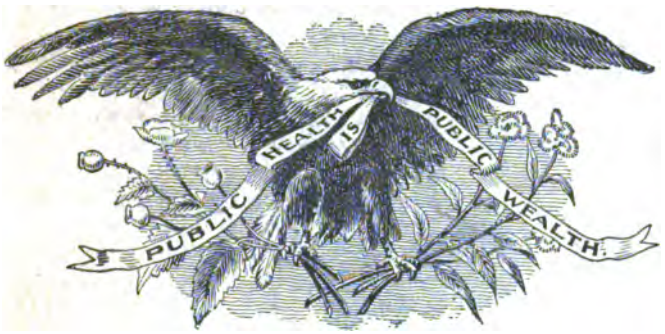

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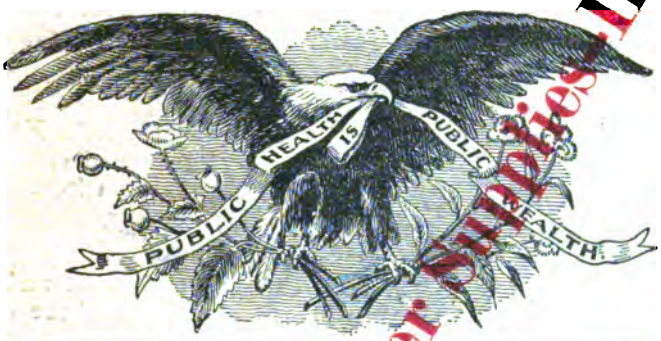

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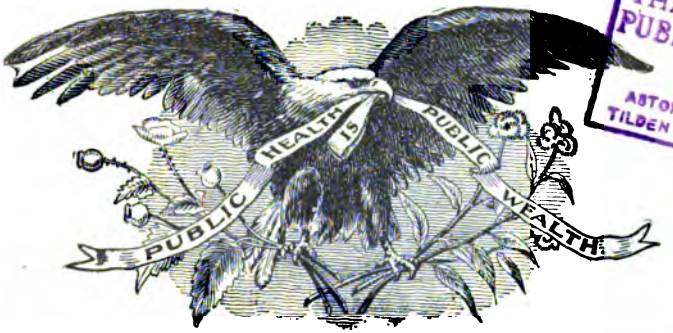

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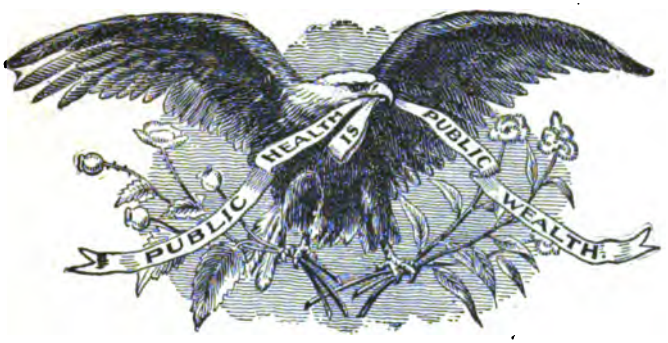

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CONTENTS.

Food Adulteration. Dr. H. W. Wiley, Chemist U. S. Dep't Agriculture. 481

Milk?—Fall River Medical Society 483

Slop Feeds. 494

Common Sources of Impurity in Country Houses. Harvey B. Bashore, M. D. 495

The Malarial Problem in the Light of Epidemiology. Andrew Davidson, M. D. 498

The Plague in India 512

(*Continued on next page.*)

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CONTENTS.

(*Continued from preceding page.*)

Typhoid Fever at Army Camps. Prof. V. C. Vaughn..... 513
Sanitary Authority. Milton Remley, Attorney General Iowa..... 516
Non-Committal..... 518
Havana's Good Health; the New Disinfecting Plant..... 519
Test for the Presence of Nicotine in Tobacco..... 521
Canadian Lepers. Dr. A. C. Smith..... 522
Financial Value of Sanitary Improvements..... 524
New Method of Waterproofing Paper..... 525
Medical Excerpt. T. P. Corbally, A. M., M. D.:
Army Sanitation in Argentina, Appendicitis in the Army..... 526
Torticolis. M. Berger..... 527
Diuretics. MM. Bardier and Frankel..... 528
Lithiated Hydrangea in Uric Acid Diathesis; Convulsions During Pregnancy..... 529
Penetrating Wounds of the Abdomen, M. Tuffier; Vin Mariani as a Tonic; the Treatment of Consumption in England..... 530
The Cancer Microbe, Dr. Bra; Experiments with Orthoform. 531
Buveurs de Petrole..... 531
Alcoholism in Children..... 532
Purity of London Water Supply; Diseases of Animals in Germany..... 533

Editor's Table.

Prize Health Rules..... 534
A Dangerous Drummer..... 535
Disinfection of Cars..... 536
School of Public Health; An International Sanitary League..... 537
German School of Public Hygiene; the New Skene Hospital..... 538
Mortality and Morbility Reports and Reviews..... 539
New Quarters for New York City Health Department..... 539
Smallpox..... 547
Health of Manila..... 548
Mortality Statistics Abroad for the First Quarter, 1899..... 548
Alcohol and the Russian Death Rate..... 551
Bubonic Plague..... 551

Obituaries.

Sir Douglas Galton..... 552
Dr. Robert Rutherford..... 555

CONTENTS.

(Continued from preceding page.)

Book Reviews.

Sanitary Engineering: A Practical Treatise on the Collection, Removal and Final Disposal of Sewage, Etc. By Col. R. C. Moore, R. E.: Longman, Green & Co. The International Medical Annual, 1899: E. B. Treat & Co. Sajous's Annual: The F. A. Davis Co. The Smithsonian Institution Report: Government Print, Washington. Buffalo Sanitary Club Proceedings....556-559

Contemporary Literature.

Summer Schools, from "Conventions and Other Gatherings," American Monthly Review of Reviews; A Boon to Busy People, John S. Stewart, Lippincott's; Alexandrian Library, from "Bright Sides of History," E. H. House, St. Nicholas; Andrew Lang's Memory, Harper's Literature; Teddy's Tutor, Thomas Tinkler, Harper's Round Table; How Bachelor Girls Live, Harper's Bazar; The North American Review; Harper's Weekly; The Century; Harper's Magazine; The Jeffersonian; The Journal of Tuberculosis. 559-565

The Hundred Year Club. 565

Index to Vol. XLII....567

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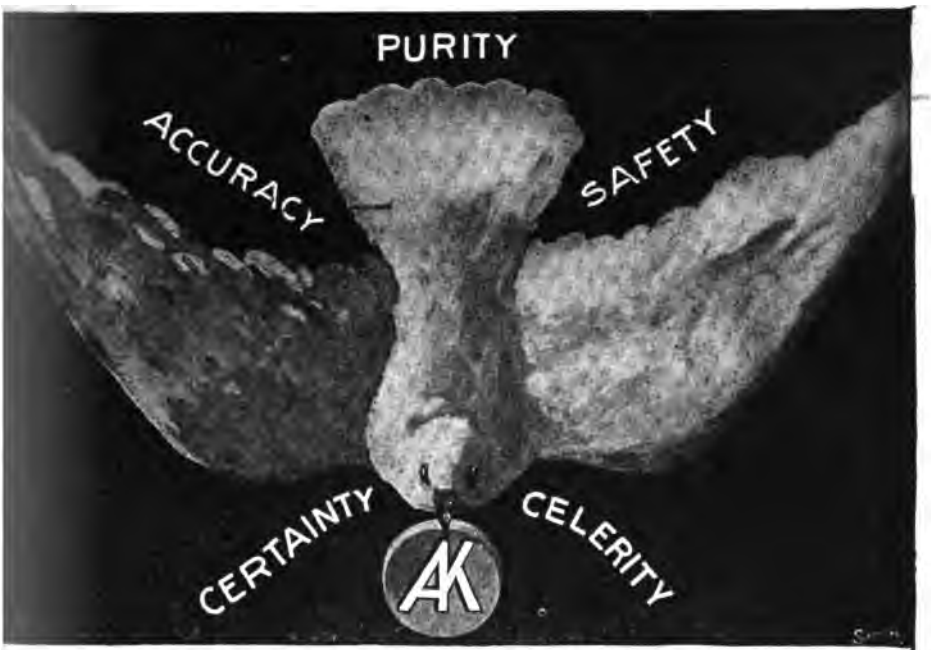

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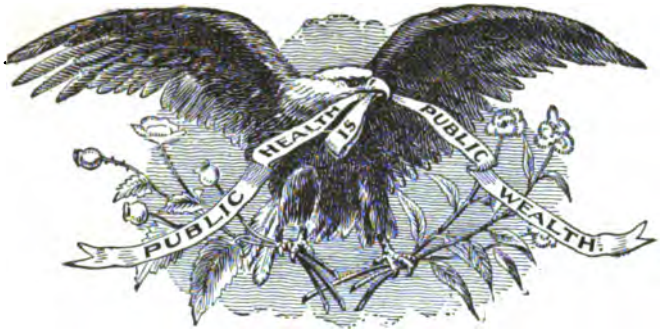

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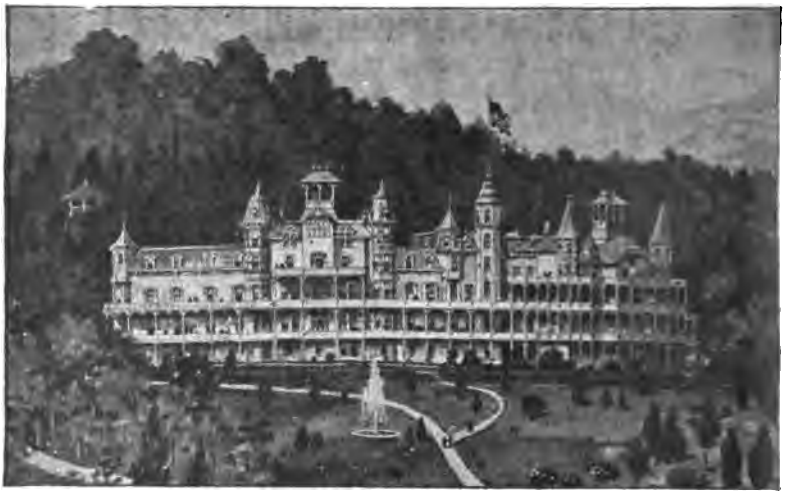

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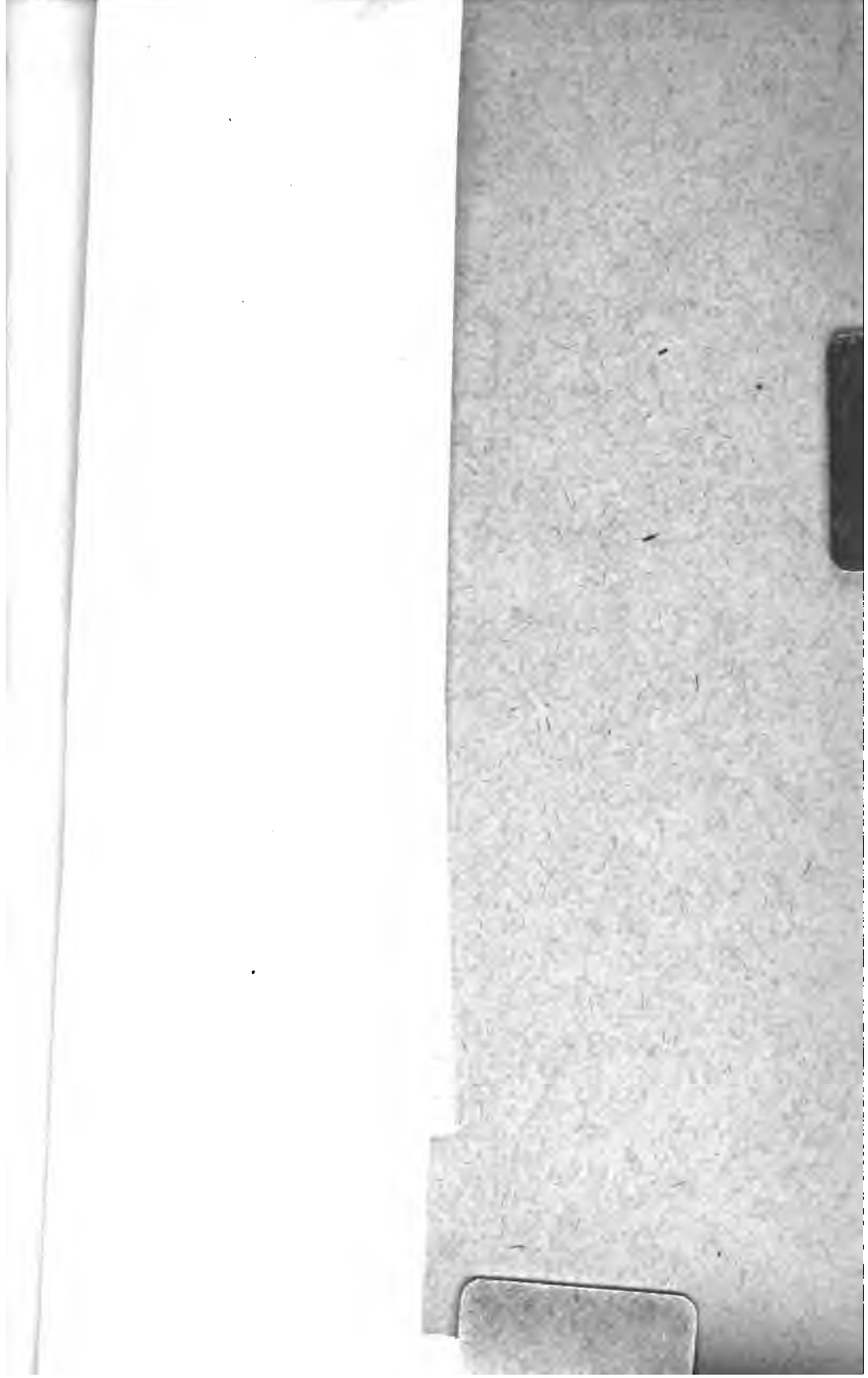

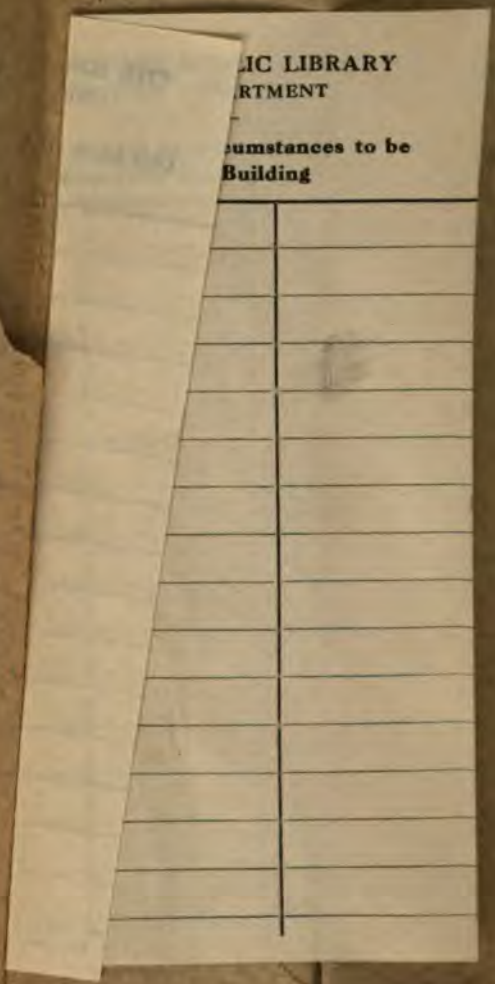
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